# LOUISIANA CONSERVATION REVIEW

SUMMER
1940

*An eclipse of the sun is so rare that many people go through life without seeing one.*

*Just as they go through life without really seeing many of the beauties that abound in Nature—the sun-rise over the limpid waters of a blue-green lake—the twilight and deepening shadows of some woodland retreat.*

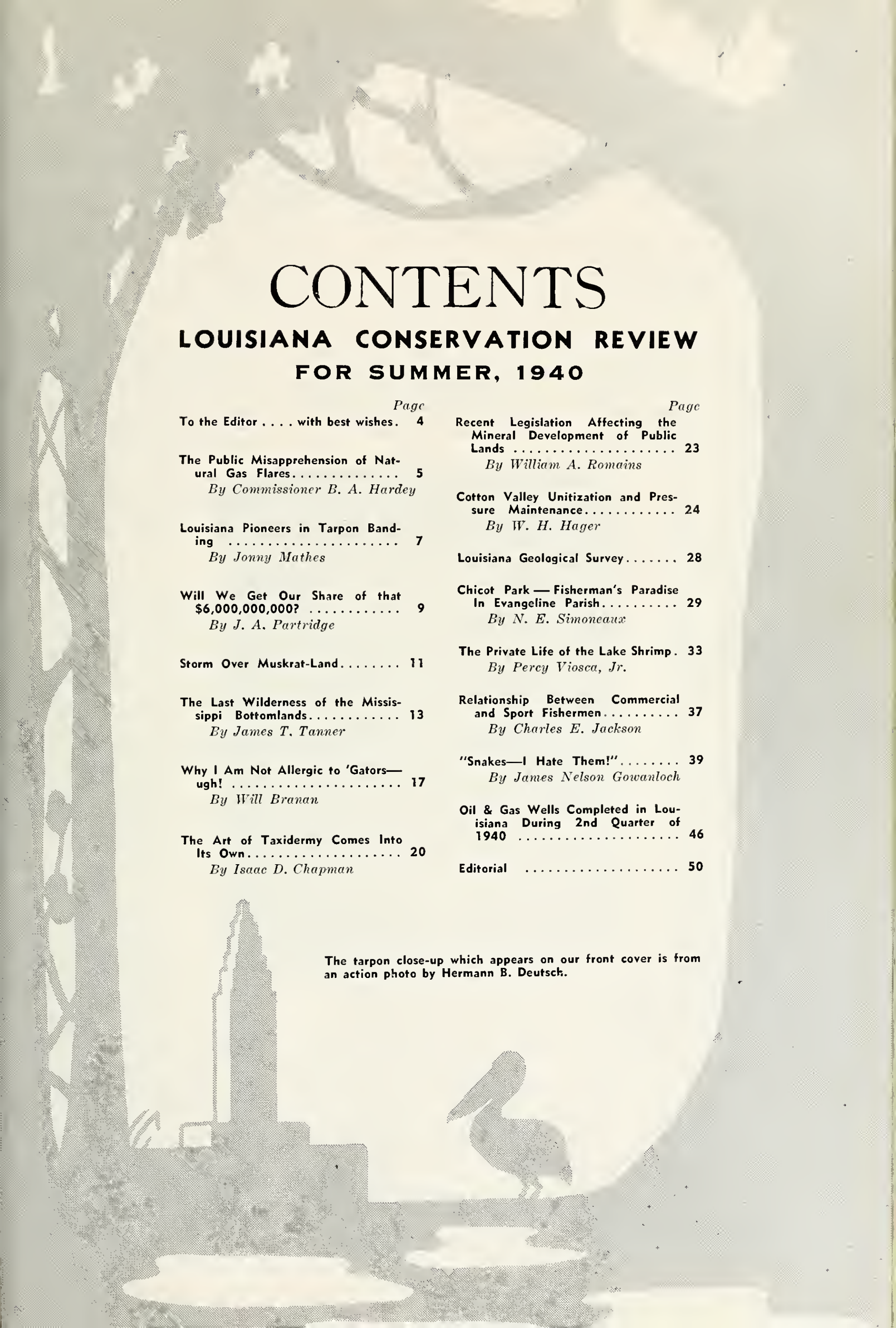
*Or hearing the simple sounds of Nature, the faint noises of small animals as they scurry about the woods—the evening song of the cricket or the bull-frog chorus from a nearby pond.*

*Louisiana is indeed fortunate in the possession of a background of such natural beauty—her people are always accessible to those revitalizing forces that have been gathered and stored by Nature for thousands, millions of years.*

*Through the conservation of our natural resources, the maintenance of our wildlife sanctuaries, we insure the preservation of this background of natural beauty for the benefit of our own and future generations.*

**DEPARTMENT OF CONSERVATION**

**126 Civil Courts Bldg.,**
**New Orleans, La.**



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The tarpon close-up which appears on our front cover is from an action photo by Hermann B. Deutsch.

# To the Editor . . with best wishes . .

The following voluntary expressions of commendation have been received recently by the Editor of the "Louisiana Conservation Review":

W. D. Hoover, gen. sales mgr. Powell Lumber Co., Lake Charles, La., July 11:

"I am a strong conservationist and a member of the Wildlife organization in this territory. I get a great deal of pleasure in reading your magazine."

Fred J. Vogel, Thibodaux, La., July 10:

"The magazine is very useful to me in my profession."

Louise Hogan, Choudrant, La., July 10:

"I teach Louisiana Geography during the school year and I find the Louisiana Conservation Review a valuable asset."

**J. W. Joyner, Pelican, La., July 21:**

**"I take the Conservation Review and think it is the finest magazine of its kind I have ever seen."**

Mrs. W. C. Allen, Jackson, Miss., July 14:

"I am an old resident of Louisiana and on a recent visit to my sister I saw the last issue and find it so interesting I do not wish to miss it."

Mrs. B. F. Mitchell, Baton Rouge, La., July 12:

"Your Louisiana Conservation Review has been a great delight to all of us. Many of the pictures I have framed."

Wayne V. Jones, chief geologist, Tide Water Associated Oil Co., Houston, Texas, July 17:

"I have read this publication occasionally for several years and have found it most interesting and constructive."

W. Miles Pearce, New Orleans, La., June 29:

"Such a publication should be greatly prized by all Louisianians."

Prof. B. M. Gile, University, La. July 8:

"I have just had an opportunity to look over your Spring issue and wish to congratulate you on the excellent material which it contains."

Bert Anderson, Baton Rouge, La. June 29:

"I certainly do enjoy your Review Keep up the good work."

**Dr. A. K. White, Morgan City, La. July 10:**

**"I appreciate so much receiving The Conservation Review. To me it is the finest thing of its kind published. Your staff seems unusually able."**

Joseph Danner, New Orleans, La., July 2:

"I think the magazine is very well planned and that it contains articles of deep interest regarding the State of Louisiana and its natural resources."

Mrs. Hillman Hundley, Eunice, La., July 6:

"I received my Spring edition Conservation magazine and am very pleased with it, especially the nice picture of our Governor. I wish to tell you we certainly have appreciated getting this magazine in the past. Our children have derived a great deal of help from the magazine in their school work.

"I've made a habit of saving these magazines and sending them to the school for the children to use. A great majority of the children's parents are illiterate and do not know of these wonderful helps that can be gotten for their children's educational help free. These magazines make sane thinking persons get down on their knees and thank God for such a wonderful country and state to live in.

"This magazine is a welcome guest in our home. The children as well as I look forward anxiously for its arrival each time."

Mrs. R. V. Reeves, Oak Grove (W. Carroll Parish) La., August 14:

"Our beautiful magazine (Conservation Review) published by you is so splendid and worth while—so much in it, choice items of our State, that I'd like to pass on to other magazines."

# Enforcement Program Effective

With Louisiana's hunting season approaching, officials of the enforcement division of the Department of Conservation have issued a timely warning to all hunters and fishermen to purchase their licenses in advance. This is in line with the new policy of the reorganized enforcement division of the Department.

With no desire to work a hardship on anyone, but with a firm determination to enforce the game and fish laws of the state, the enforcement division is being reorganized on the policy that only by strict enforcement of the laws can there be proper conservation of Louisiana's game, fish and wildlife.

There are two indications already to show that the enforcement program is proving effective and is meeting with general popular approval on the part of the rank and file of the sportsmen of the state. The first indication is the increase in the number of licenses issued during the past few weeks by the Department of Conservation, and the second is the increase in the number of arrests made by agents of the Department of persons charged with various violations of game laws.

The reorganization of the enforcement division is under the direct supervision of J. A. Partridge, Executive Assistant to Commissioner B. A. Hardey. The chief enforcement officer of the Department is D. L. Simon of Crowley.

A total of 33 new game wardens in 25 parishes in the state had been appointed up to August 21st. By parishes, they follow:

Allen, John W. Elliott; Ascension, Walden LeBlanc; Beauregard, L. W. Cooper; Caddo, Earl Vaught, J. V. McConnell, district supervisor; Calcasieu, Pete Baham, Clifton Reeves; Cameron, C. V. Crane, Murphy Hebert.

East Feliciana, W. A. Cook; Franklin, W. J. Disch; Grant, Earl Nugent; Iberia, Wilton Decuir, Walton Toffier; Iberville, Chas. J. Olano; Jackson, H. B. McDonald; Jefferson Davis, Wm. Chapman, Robert Prather, district supervisor.

Lafayette, Gordy Simon; Lafourche, Lodger Duet; LaSalle, L. R. Doughty; Natchitoches, P. T. Chaplin, P. T. Huddleston, Chas. Weaver; Rapides, Roland Stafford; St. Charles, Robert D. Landry; St. James, Harry Y. Roddy; St. Landry, J. M. Clanton; St. Mary, Cecil Gilmore; Terrebonne, B. J. Eymard; Union, John T. Hollis.

# The Public Misapprehension of Natural Gas Flares

by

B. A. Hardey

There has been some discussion of the apparent waste from natural gas flares in South Louisiana; and I feel that the public should be better informed on this important subject.

The public misapprehension may be explained to a certain extent by the failure to clearly distinguish between natural gas produced primarily for commercial consumption and gas that is flared after it has performed its primary function of assisting in the production of oil.

In the case of a producing well with the average gas-oil ratio of 1,000 cu. ft. to one barrel of oil, it will be seen that the value of the gas at the well is from 3 to 5 cents, whereas it has performed the indispensable service of assisting in the production of crude oil with a value of $1.00 to $1.40, besides certain other services, which I will outline.

While this flared gas may be considered waste, in a strict interpretation of the word, it is somewhat analogous to the oil which lubricates your car and is then drained off. This oil has served its primary purpose, but through processes of recovery it may still serve other useful purposes.

Let us trace this flared gas to the reservoir where it is in solution with the oil. Emerging from the reservoir it first assists the oil to flow through the formation to the well bore, where it helps the hydrostatic pressure in the formation to lift the oil to the surface.

At the surface the oil is separated from the gas by a mechanical device known as a "separator". Here the gas performs another service, inasmuch as the pressure maintained by the gas is sufficient to transfer the oil from the separator to the lease storage tanks.

Here the usefulness of the separated gas is by no means ended—it is put to work to perform many valuable functions before it is finally flared.

Under strict supervision of the Department of Conservation operators are permitted to use the gas for supplying power to various prime movers, such as lease transfer pumps, chemical treaters and salt water injection pumps, etc. Where there is an active drilling program in operation in an area, the gas from the separators is burned under the boilers to generate steam for driving the drilling engines, slush or mud pumps and turbogenerators for electrical equipment and lights.

**Conservation Commissioner B. A. Hardey**

## PRORATION RESULTS IN LONGER FLOWING LIFE

Proration has become a general and accepted institution in the oil industry—producers are aware of the fact that with restricted allowables longer flowing life has been added to the fields, so that greater ultimate recovery may be anticipated.

This is due to the proper use of the reservoir's energy which is made up of a combination of two factors—gas and salt water. Pressure maintenance equipment has been installed in several fields with notable success. By pressure maintenance is meant the return or reintroduction to the reservoir of gas which has been processed for most of the hydrocarbon compounds and is then compressed and injected into the formation whence it came, thereby helping to keep the formation presure at its original level.

The Continental Oil Company, in its operation of the Tepetate and Ville Platte fields, has been a pioneer in the necessary experimentation and development of recycling projects in Louisiana. Through the employment of this modern technique the Company has doubled its estimate of recoverable oil and has produced to date more than its original estimate.

Similar projects are now contemplated in the Cotton Valley, Lake Arthur, Lake Mongoulois and South Jennings fields. Large producers in other fields are investigating the possibilities of this conservation measure.

Pressure maintenance and recycling have made it profitable for operators to develop and produce fields with high gas-oil ratios. If operated under ordinary conditions the production of these fields would be so penalized, under Department of Conservation regulations, that it would mean an economic failure, or, if permitted to operate without restriction, it would mean a tremendous waste of natural gas, which in the near future may be of inestimable value to the State.

Gas is usually purchased at the well head or separator for a price anywhere between three and five cents per thousand cubic feet. However, this is only the beginning—to this basic cost must be added transportation, distribution, leakage and a multitude of other costs incurred before the commodity can be marketed at retail.

A very large investment in pipe-line facilities for the distribution of gas, the market demand and other factors differentiate the actual value at the well and at the consumer's door. Certainly it is not so much a question of the value of the product itself as it is the production in commercial quantities by scattered and sometimes isolated producers, the investment in distribution equipment and the creation of a stable market demand.

There are many oil fields selling gas to pipe-line systems, but there is this to be remembered—that in order to deliver gas to a pipe-line system the gas from the separators must have a higher pressure than that maintained by the pipeline. The reason is obvious. Unless large quantities of low pressure gas are available and a ready and constant market is at hand, a compressor station operated to inject the low pressure gas into a high pressure system would not be economically feasible.

It is interesting to note that in providing gas for New Orleans, or other large Southern communities, it is necessary to install and maintain equipment that will take care of a maximum load which will be needed for only a few days during the Winter, whereas in the case of the extended Winter season of the highly industrialized Northern community the equipment would be employed at its peak for a much longer time and the investment cost would therefore be distributed over the proportionate period.

### DISTRIBUTION COSTS MUST BE ABSORBED

So far as I know there are no economic restrictions to the utilization of natural gas for fuel and power, provided industry or domestic consumption absorb the cost of transportation and whatever equipment is required for delivery to the plant or household. That is illustrated in the case of the Lafitte oil field, twenty-two miles southwest of New Orleans, which is not only a source of gas supply for the Southern metropolis but also supplies gas for the power operations of Port Sulphur, fifty miles down the River from New Orleans.

But it should be borne in mind that if the Lafitte field were not capable of producing a certain volume of gas in excess of its own requirements and if New Orleans and Port Sulphur were not capable of a sustained demand every day throughout the year such a distribution would not be profitable.

**Editor's Note: Major Hardey was reluctant to discuss what might be considered a controversial subject, but he felt that the public should be enlightened as to the utilization of flared gas before it is finally burned and also informed as to the notable progress that is being made in the conservation of gas through recycling and re-pressuring projects.**

All of these reasons are advanced to show the public that the oil and gas industry is not carelessly or indifferently wasting gas, but for sound engineering and economic reasons some of the gas must be flared—that is, burned to avoid the danger of explosion, etc. However, considerable progress is being made towards a solution of the problem and a reduction of the remnant of waste to a minimum.

### SCIENTIFIC APPROACH TO COTTON VALLEY PROBLEM

In the case of some fields the problem is complicated by the underground waste of oil itself because of low gas pressure, and the scientific approach to this problem is illustrated by the Cotton Valley operators, who have reached an agreement for unification of their field through co-ordinated pressure maintenance of the entire producing area. This recycling project is discussed by one of the Department engineers in this issue of the Conservation Review.

We are indeed gratified that the Cotton Valley operators have had the initiative and the co-operative spirit to undertake such a joint enterprise. While it entails a tremendous long-time investment, it surely represents a triumph of vision and enterprise over the short-sighted self-interest that was once manifest in the exploitation of our natural resources.

In the case of Cotton Valley, as in other fields where modern scientific technique is employed, the State is the chief beneficiary, through the conservation of its natural resources, to the end that the people as a whole may derive the greatest benefit from the enterprise of capital and labor and management.

An important feature of the new conservation law enacted by the General Assembly at its recent session (Act 157 of 1940) is that which grants authority to the State to require gas recycling and unitization of separate ownerships in such projects.

Section 4 (b) of the Louisiana law, relating to the new provision, reads:

"In order to prevent waste, and to avoid the drilling of unnecessary wells, the director (of the Minerals Department) shall, after notice and upon hearing, determine the feasibility of and require the recycling of gas in any pool or portion of a pool productive of gas from which condensate or distillate may be separated or natural gasoline extracted and promulgate rules to unitize separate ownerships and to regulate production of the gas and reintroduction of the gas into productive formations after separation of condensate or distillate or extraction of natural gasoline, from such gas."

A number of high-pressure condensate pools have been discovered in Louisiana, which ranks next to Texas in the volume of such reserves.

The public should not fail to be impressed by such constructive measures to conserve these great natural resources, in the light of latter-day scientific achievements in the treatment of these problems.

The Department of Conservation through its regulatory powers is fostering every method or plan that appears feasible for the protection and conservation of this natural resource.

If it is not yet possible to utilize all of the flared gas that arouses the ire of Mr. John Q. Citizen, he may still take hope from the packer's ingenuity in utilizing all of the pig but the squeal.

### ORSON WELLES, WELLES!

The generally accepted belief that hordes of starfish descend—a la Orson Welles—on the oyster population of America's waters has been proved false by scientific tests conducted by the U. S. Fish and Wildlife Service. Starfish are—and always will be—predators of oysters, but they do not swoop down on their prey.

"The starfish populations are practically stationary," insist scientists of that portion of the Fish and Wildlife Service devoted to the study of fish. "Sudden increases are due to an accelerated rate of reproduction and survival, rather than to migrations."

So, if you are an oyster, fearful of a blitzkrieg by the starfish—have no fears.

### TOO FUR NORTH?

Popular belief has it that only in the cold countries of the far North are good fur animals to be found. As a matter of fact, furs can come from too far north. For instance, the fur of the average Canadian muskrat is the poorest of all the rodent furs in wearing quality. This is attributable to the fact that in cold weather the Canadian muskrats absorb their own fat for food, which thins the pelt and impoverishes the fur.

# LOUISIANA PIONEERS IN *Tarpon* BANDING

by *Jonny Mathes*

The interest of sportsmen and conservation officials are almost the same, though—thanks to politics—the two groups occasionally become antagonists. But in the main, the sincere members of both are working toward the same end, the preservation of furred, feathered and finny wild life so that the source of what provides healthful and wholesome pleasure and recreation for the millions shall never diminish to the vanishing point.

But it is not often that the sportsmen have an opportunity to work so closely in co-operation with the conservation authorities as in the newest project of the Louisiana commission. This is the banding of Tarpon. The enterprise may prove successful or it may not. Only experience can settle the question. We can all argue ourselves black in the face—a favorite diversion among sportsmen, it must be admitted—and get nowhere. The laboratory test, the tests of actual experience, is the only agency which can answer it.

Every one of us has heard the ancient controversy of whether or not a released tarpon lives to tell the tale. Some are absolutely passionate in advancing the view that a tarpon is so exhausted by the struggle against the angler that even when released he falls easy prey to the sharks that infest our tarpon waters. Others contend that in the fierce intensity with which he fights against capture, the very gallantry that so delights the angler, he invariably ruptures important blood vessels and bleeds to death.

Others are just as impassioned in defending the theory that most of the tarpon released do get away and live to enchant other sportsmen, or to beget other tarpon.

The only way to settle the issue is by the capture—the re-capture, naturally—of tarpon which can be definitely identified as having been captured once before. The only way this can be done is to band captured tarpon before releasing them, in much the same way as millions of migratory birds are banded every year by the federal wild life bureau in co-operation with the sportsmen of this nation.

Of course, there are important differences. Crimping a light aluminium band about the leg of a trapped duck or heron is a bargain compared to placing a band upon an active and uninjured Silver King.

For one thing, there is little previous experience to draw on for guidance. For another a light and readily manipulated aluminum band would be swiftly corroded by the action of sea water.

Yet there is a much more important purpose in banding tarpon that settling the academic issue of whether or not a released tarpon survives his struggle. Tarpon are potentially a tremendous economic asset. Million dollar fishing resorts have been built up along previously waste stretches of the Florida coast on tarpon fishing; and in places where tarpon are nothing like as abundant as they are along certain parts of the Louisiana coast.

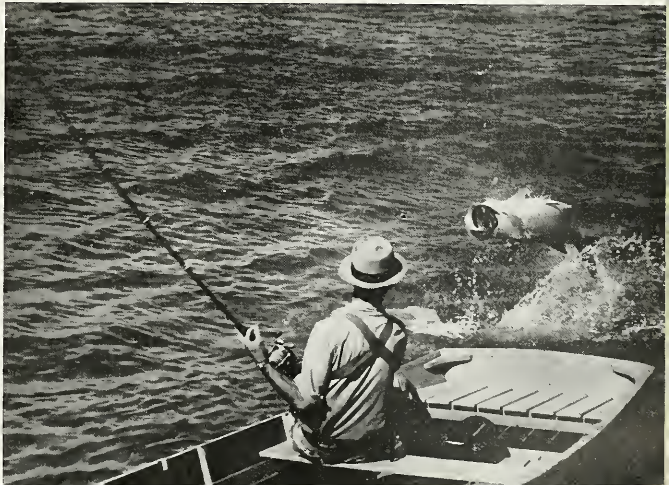
### Billion-Dollar Industry

Counting the Pacific coast, the Gulf Coast from Florida completely around the West Indies, and the Gulf Stream section of the Atlantic Coast, tarpon are probably more than a billion-dollar industry.

In spite of this enormous possibility for revenue to the localities where tarpon abound, little or nothing is known about the tarpon's life history. The available data are gathered in Dr. Babcock's book on the tarpon. They are rather less than meager.

The same thing was true of the salmon, whose life cycle remained a mystery until the government bureau of fisheries began tagging the parr before releasing them, and thus following their life cycle around the Japan current. The

**" . . . potentially a tremendous economic asset."**
—Photo by Hermann B. Deutsch



same thing was true of shrimp, until the government began tagging shrimp and paying a reward for the return of the tags.

A proposal to band tarpon was suggested by Hermann B. Deutsch of The Item and Dr. James Nelson Gowanloch of the Conservation Commission last year, after the first Item-Tribune tarpon rodeo at Southwest Pass. There would be no profit in re-hashing the political turmoil which kept the Conservation Commission stirred up during the past winter. That's all water that's gone under the bridge. The important thing is that when the proposal was broached to Major B. A. Hardey, the present commissioner, and Joe A. Partridge, the executive assistant in charge of wild life, both instantly grasped the possibilities of the plan, and the importance to Louisiana of having this state take the lead in putting it into practice.

The only previous experiments on which a working project could be modeled was an attempt by the government, some years ago, to band marlin. Only 80 or so were banded, and to date none of the bands have been returned. However, marlin are far less numerous in fishermen's catches than tarpon. From the point of view of fish population, it would be simple to band much more than 80 tarpon.

### Monel Metal Tag

The only metal which could be used to provide workability and resist the action of sea-water was monel, a steel alloy. Special pliers were devised to make it possible to lock a monel metal tag across the back of a big fish's dorsal fin.

**Editorial Note: As an expert in tarpon banding (and literary dilettante) Mr. Mathes is under the tutelage of Mr. Hermann Deutsch, of the New Orleans Item-Tribune.**

Upon application to the federal bureau of fisheries, two of the pliers and a number of the bands were sent to the Louisiana department, and on a recent trip to Southwest Pass a method for applying the bands to tarpon was worked out. In the party were Mr. Partridge, H. Edouard Morgan of the Conservation Commission's museum staff, Mr. Deutsch and the writer. Fourteen tarpon were landed in a day and a half of fishing. Eight of them were banded.

The procedure will here be outlined because the writer proposes that Louisiana's sportsmen, who fish for tarpon anyway, and who will land hundreds of them during the season, join the commission in banding all tarpon which are still in good physical condition, before releasing them after capture.

Two persons are needed. It may be that somewhere there is one man so strong and agile that he can bring an active tarpon to the boat while still green, and handle leader-wire, band and pliers himself. The writer doubts it. Bring the fish to the boat as green as possible. Horse him in, if necessary and if your back and arms can take it. Then let one man grasp the leader wire in a stoutly gloved hand. DO NOT GAFF THE FISH. It was our experience that in threshing about against a rigid gaff the fish injured himself more than in struggling against the angler's tackle.

While one man thus grasps the leader-wire and "leads" the tired fish alongside of the boat, the other man slips a band into the jaws of the pliers. Better tie one leg of the pliers to your belt with a length of cord. Things are likely to get pretty lively and there are times when you must grab yourself a double handful of boat to keep from being tossed overboard. You can't do that and hold onto the pliers too.

As the tarpon comes alongside, gently lift the upper spine of the dorsal fin, with your left hand, put the jaws of the pliers across it as far toward the fish's back as the pliers will go, and then close them home with all the strength in your right hand.

The hook can then be released from the fish's jaws, and he will swim off if otherwise uninjured. Naturally it is of the utmost importance to keep a record of the date, the number of the band used, the approximate size and weight of the fish, and, for preference, the name of the angler who caught him.

The Conservation Commission's "Pelican" and the writer's little lugger "Tarpon" will band every silver king brought to gaff by their anglers this season. However, considering the various rodeos held along our coasts from the Mississippi's mouth to Grand Cheniere, there

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# Will We Get Our Share of that $6,000,000,000?

by
J. A. Partridge

There are certain aspects of our program for the conservation of Louisiana wildlife and the enforcement of our fish and game laws that should receive special consideration.

I believe I may discuss the subject from the sportsman's viewpoint, as I have been hunting and fishing since early boyhood and feel that I am familiar with many of the problems of the sportsman in this State.

Louisiana has been blessed with such an abundance and variety of wildlife that our sportsmen may not appreciate the fact that we are provided at practically no cost of effort or money with what the sportsmen of other states have had to struggle for at considerable expense and sacrifice.

Indeed, Louisiana is one of the last of the American frontiers where Nature and not man provides such an abundance of fish and game that our sportsmen have been lulled into the delusion that the supply is inexhaustible.

For some years now it has been necessary to replenish the streams of the Northern states with game fish and restock the fields with quail. The supply of big game in most states is practically exhausted and that of small game can only be maintained by strenuous effort and unceasing vigilance.

We can readily understand the causes that have contributed to this situation in the North and East. There was no general recognition of the necessity and desirability of conserving wildlife resources until recent years and there was such an acceleration of the population growth that the supply was greatly diminished before practical steps were taken to renew it.

In such highly industrialized states as Indiana and Illinois the encroachment of industry followed that of agriculture, destroying the natural habitat of their wildlife. While there was a continuous increase in the number of hunters and fishermen as a result of the population growth, there was a reduction of the areas of forest and swamp and a consequent reduction of the fish and game supply.

On the other hand Louisiana has always been an agricultural state and it is just now entering a new era of industrialization. Its rural population is not dense—its large plantations have not yet been divided into comparatively small units, as in the Middle West, and there are vast areas that have not been drained. This means that a large proportion of the State's acreage is still in the virgin condition most favorable to wildlife.

Of the 32,000,000 acres within the boundaries of Louisiana there are approximately 2,000,000 acres under water, in our rivers, lakes, lagoons and bayous, which means a great variation in the character of the habitat and a great variety of fish species with which to tempt the angler. In addition we have a long coast line, indented with bays and estuaries, from the southern border of Mississippi to the eastern border of Texas, so that our salt water fishermen are offered some of the best sport in the world.

**Editor's Note.—Roger Babson, the statistician, estimates the American tourist crop for 1940 will yield around $6,000,000,000. On the basis of population, with intensive cultivation, Louisiana would be entitled to approximately $100,000,000 of this stupendous income—about the same income as that produced by her cotton crop, more than her sugar and rice crops combined. Something to think about, as Mr. Partridge clearly demonstrates in the accompanying article.**

Besides such edible game fish as the King Mackerel, Redfish, Sheepshead and other popular species we are just beginning to publicize the tarpon fishing of our coastal waters. "The Silver King" is even landed in large numbers in Lake Pontchartrain, within the city limits of New Orleans.

While the situation in other states may well serve as an object lesson to Louisiana, it also points the way to an opportunity that is probably possessed by no other state in America to the same degree. We can claim no credit for the fact that Louisiana is the sportsman's Paradise—and we will not quibble over that—but we might well take credit for improving this condition, provided we do, by careful planning, taking stock of what Nature has bestowed on us in such generous measure and safeguarding by wise laws and their enforcement the future wildlife of the State.

It will hardly suffice to establish fish and quail hatcheries unless we make an intensive study of scientific methods of distribution that have been found most effective in other states. The selection and preparation of the habitat are just as important as the propagation of the fish and quail in any successful program of restoration.

While we may well consider the improvement of sport for sport's sake, it is also necessary to consider the vast importance of utilizing our natural hunting and fishing grounds to their fullest capacity in connection with the rich tourist trade.

Surely we will be able to take care of the requirements of our own sportsmen, but I am thinking of the tremendous influx of visitors who will be coming into our State in the immediate years ahead of us. This tourist crop is now one of the principal American crops—its annual harvest is estimated at around six billion dollars. "See America First" is no longer a meaningless slogan, especially with the blackout of European travel.

I can think of no other sport that will entice the stranger within our gates and keep him here for a longer period, than the chance to land a few specimens of the finny tribe, whether tarpon, bass or perch. If he travels in a car with his family, as he often does, he will spend his money with our hotels and merchants—in fact, the entire community will benefit financially from his visit.

The industry that caters to the angler is big business in the U. S. A. to-day. The sale of fishing togs, tackle, boats and other accessories is mounting in volume every year.

And it offers a very real opportunity for scientific planning and publicity in order that we may not only attract this rich tourist trade, but that we may bring back the customer through the satisfaction and good will which naturally attend a successful outing in the woods, even if the only tangible result of a hard day's fishing is a small string of goggle-eye that will greatly increase in size on the angler's return home.

Louisiana has approximately 800,000 acres dedicated as parks, wildlife sanctuaries, fish and game refuges—and it has thousands of out-of-the-way fishing haunts known only to the fishermen of the immediate locality. Although as a sportsman I can readily appreciate the reluctance of the local angler to disclose the location of his favorite fish hole, where they jump out of the water to take the lure—I can see that as a public policy, in pursuance of a broad program in the public interest, we should publicize the location and other information relating to our attractive fishing grounds, seek to make the visitor's stay enjoyable as well as profitable to the local inhabitants. By "profitable" I do not mean all that the traffic will bear, as that is one certain way to kill "the goose that lays the golden egg." Not that the fisherman is a goose—so help me!

We are all familiar with the fact that Louisiana is the winter resort of 75 per cent of America's migratory waterfowl, that ducks and geese find ideal conditions for feeding and resting here. But it is not so generally known that deer may be killed in season within an hour's ride of New Orleans. In fact, the hunter is offered a great variety of sport, from the marsh-land of south Louisiana to the uplands and hills of middle and north Louisiana.

There has always been an abundance of small game in Louisiana, but our hunters are now confronted with a problem that has troubled the Northern sportsman for some years, that of restocking the quail habitat. This is not as simple as it may appear. It is not enough to release a few birds in scattered areas. It is necessary to provide food and shelter over a period of years. This calls for co-ordinated effort on the part of our public officials, our sportsmen, farmers and the public at large, all in co-operation with the Conservation Department.

Only through concerted action and a follow-through plan may we hope to restore our depleted stock and assure a continued supply for the increasing requirements of our hunters.

Such a program of publicity should appeal to local chambers of commerce and other public-spirited citizens—and should be encouraged by State and municipal authorities. If American tourist crop now yields $6,000,000,000 we do not want our share to go to California, Florida, et al.

Nature has provided us with a background that is not surpassed in America as a wildlife habitat—by scientific planning and the wise administration of our conservation laws we should not only possess a sportsman's Paradise, but we should see to it that it is so recognized throughout the country.

## WILDLIFE REFUGES IN LOUISIANA

| | acres |
|---|---|
| **STATE OWNED:** | |
| State Wildlife Refuge (Vermilion Parish) | 13,000 |
| Russell Sage Wildlife Refuge (Marsh Island, Iberia Par.) | 79,000 |
| Rockefeller Foundation Refuge (Cameron & Vermilion Par.) | 86,000 |
| Pass-a-Loutre Hunting Preserve (Plaquemines Parish) | 66,000 |
| St. Tammany Game Preserve (Nott Plantation) | 6,000 |
| **LEASED TO STATE:** | |
| Singer Wildlife Refuge (Madison Parish) | 81,000 |
| Ayres-Fisher Preserve (Tensas & Madison Parishes) | 45,000 |
| Theo Terzia Game Preserve (Morehouse Parish) | 118,000 |
| Northwest La. Fish & Game Preserve (Winn & Natchitoches Par.) | 27,000 |
| **FORESTRY PRESERVES—Privately Owned** | |
| Urania Forest Preserve (LaSalle Parish) | 28,000 |
| Lote Thistlewaite Game Preserve (St. Landry Parish) | 11,280 |
| Great Southern Lumber Co. Preserve (Washington Parish) | 5,000 |
| State Forest (Rapides Parish) | 6,000 |
| **OWNED BY NATIONAL ASSOCIATION OF AUDUBON SOCIETIES** | |
| Paul J. Rainey Wildlife Refuge (Vermilion Parish) | 26,000 |
| **FEDERAL OWNED REFUGES:** | |
| Delta Migratory Waterfowl Refuge (Plaquemines Parish) | 45,000 |
| Sabine Lake Migratory Waterfowl Refuge (Cameron Parish) | 137,233 |
| Lacassine Migratory Waterfowl Refuge (Cameron Parish) | 22,304 |

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### COLD AND SLOW

Repeated experiments have proven that the temperature of a hibernating animal is usually about five degrees lower than the surrounding air . . . so, if the air were so cold that the animal's body temperature went below the freezing point, it would freeze to death . . . which is probably the reason most animals "dig in" for the hibernating period . . . Incidentally, heart action is almost suspended during complete hibernation . . . for instance, the heart beat of an active ground squirrel is normally around 350 a minute . . . yet the heart of the same animal slows down to about seventeen beats a minute —or about every sixteen seconds—during hibernation.—American Wildlife.

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It is a fact that a fish may be drowned in water under certain conditions. This will happen when a fish is placed in water devoid of oxygen, or when certain swift-moving fish, such as the mackerel, are restricted so that they cannot swim rapidly. It appears that the current of water produced solely by the opening and closing of the gill covers does not supply sufficient oxygen to maintain life in these fish, even though the water is saturated with oxygen.

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The emu is one species of birds in which the male hatches the eggs.

### PROSPECTS FOR INCREASED DUCK MIGRATION

Washington, D. C.—Pre-season alarmist hullaballoo to the contrary, ducks and other migratory waterfowl are now enjoying better-than-average nesting conditions in Canada, according to reports of the U. S. Fish and Wildlife Service and the American Wildlife Institute.

These good conditions for raising young and the fact that the birds returned to the breeding grounds in larger numbers and in somewhat better condition than last year, point to a banner duck hunting season this fall, in the opinion of expert observers.

The early lack of water in Canada which prompted dire prophecies of greatly depleted supplies of waterfowl may prove a left-handed blessing, according to information from competent biologists.

"If there had been heavy rainfall during early spring, in all probability ducks would have nested in shallow sloughs and potholes which would have dried up during the drought conditions that prevailed in the Prairie provinces during May and early June," the biologists point out. "As it was, the birds nested in deeper water areas which did not dry up and, as a result, are 'sitting pretty'."

Rain, and plenty of it, came after the first week in June. Part of a report submitted to Frederick C. Lincoln, of the Fish and Wildlife Service, reads: "Rain has finally hit the drought area in the Canadian Prairie provinces. One newspaper stated that more rain fell at one time than at any time during the past ten years. Little run-off is expected and it appears few broods will be lost."

# STORM OVER MUSKRAT-LAND

Speculation has been rife over the effects of the recent hurricane on the wildlife of Louisiana coastal parishes, particularly the muskrat, which is the principal fur-bearer of this region.

The inundation of salt water throughout the marsh-land undoubtedly took its toll of the muskrat population. The muskrat has no such organization as the Red Cross to assist in the evacuation of his domicile when flooded by high waters. It is true that he is amphibian, accustomed to an aquatic environment, but in the face of the terrific gales that swept across his home-land, and the tidal waves that destroyed his nest and the food supply which he had stored against a "rainy day"—but not quite so rainy—it is indeed the application of the law of Nature that only the fittest shall survive.

The young muskrat, not yet having acquired the strength and experience to contend with these wild elements of Nature, is the one most likely to be reported missing when the winds have subsided and the waters recede. Separated from the older members of his family, the little fellow swims around as best he can, seeking a landing spot in that strange bedlam of "sound and fury"—perhaps frightened by the crash of thunder and the flash of lightning—certainly confused by the tidal waves of salt water that sweep over him in apparently unending procession, perhaps burying him in a watery grave of three-cornered grass, which is the muskrat's heaven.

Old-time trappers tell us that these little ones are blinded by the salt water, and while there is no scientific confirmation of this it is a fact that the muskrat is accustomed to brackish water, which is a combination of fresh and salt water, and no doubt the high salinity of the hurricane water would prove disconcerting if not fatal. In the struggle for survival it might prove too great a handicap for the weaker members of the family.

The muskrat is a very domestic animal, devoted to the members of his family. When either or both of the parents are lost the elder brothers and sisters will fend for the younger ones, going out to forage for them—searching for them and bringing them back to the family nest. One can imagine that in the case of a tropical storm that increases in wind velocity every minute, and the consequent onrush of high waters, there is every effort made by these elders to protect the little ones—and as the storm reaches a crescendo of fury and destruction it is a real test of muskrat courage and fortitude.

As the waters recede one might surmise that there would be some ambition on the part of the adult muskrats to re-establish their homes, to rear new families—to start life over again. But the mating period has passed—the muskrat is non-polygamous and it is difficult to picture him in a new home, surrounded by a new litter of little ones. Even if he were so disposed, the storm has played havoc with his habitation. He is a strict vegetarian and it will take time to restore the grasses which are necessary to an abundant life in muskrat-land.

Louisiana leads all other American states in the production of muskrat, which will yield from three to six million pelts yearly. The recent hurricane may cut this yield considerably, although it would take a hardy soul to make any estimate at this time. It will be hard on the trapping industry, which provides a livelihood for eight or nine thousand families in the muskrat parishes.

It is an industry in which the sacrosanct law of supply and demand appears to have little effect. That is, there is very little compensation in price per pelt because of the comparative scarcity. The muskrat is a protean fur, being used extensively in the reproduction or imitation of other furs under various trade names. When there is a shortage in the muskrat crop, the dealers will turn to some other fur that will serve as a substitute, even though it may not have the quality or durability of muskrat. This tends to restrain any advance in price that might naturally be anticipated.—W. B.

**" . . . a watery grave of three-cornered grass, which is the muskrat's heaven."**

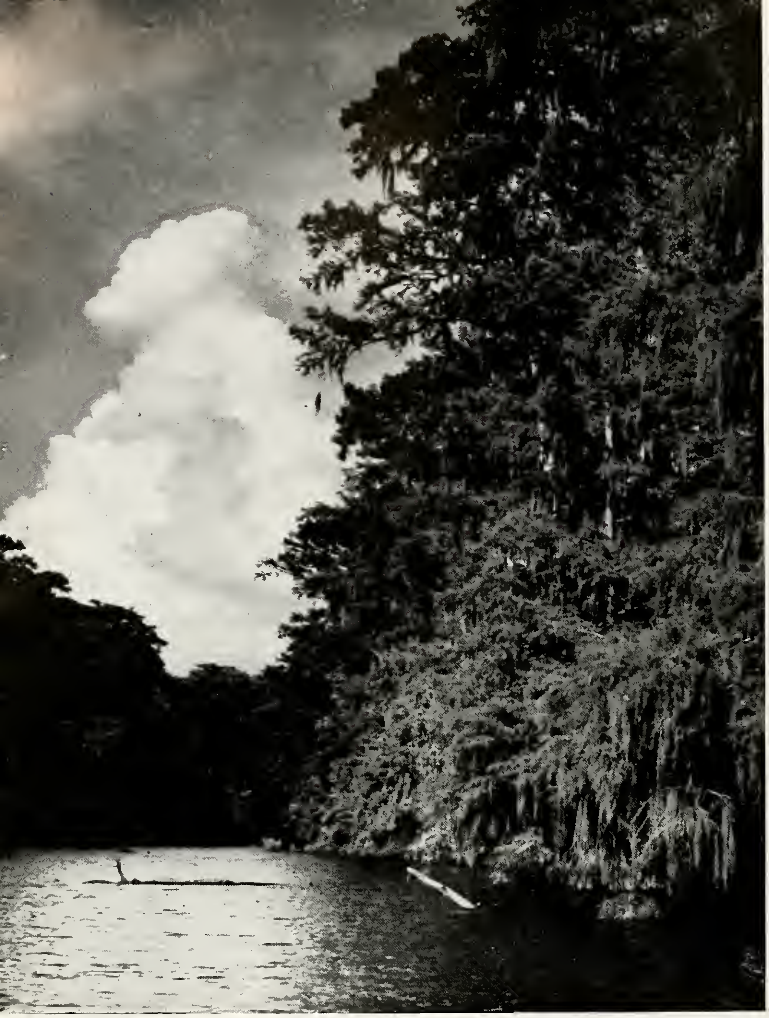

Photo by John T. Tanner

■ Rainey Lake in the Tensas Swamp.—This lake held the most alligators and the best fishing of any in the forest.

■ **Big Sweet Gum Trees**—These are on a low ridge near the Tensas River where such trees are common.

# The Last Wilderness of the Mississippi Bottomlands

by
James T. Tanner

*(Photographs by the Author)*

The vast hardwood forest of the Mississippi River bottomland, once unbroken woods that stretched from the Ohio River to the Gulf of Mexico, was the finest and largest forest of its kind in North America. It contained a variety of oaks, sweet gum, ash, and other trees, many of them reaching towering heights, with massive trunks rising to their leafy tops, and it was alive with a profusion of birds and wild animals.

This forest, formerly filled with valuable timber, has been logged steadily for several decades, and the land then cleared, until now it is almost completely gone. One good example of it still remains; that is a tract of about ninety square miles in Madison Parish in northeastern Louisiana. There can still be seen the primitive woods that once reached so far, and can still be read the story of the swamp.

The alluvial valley of the Mississippi might well be called the largest river swamp in the temperate regions of the world. An elongated triangle of rich bottomland lying almost entirely on the west side of "Old Man River", it is but a few miles wide at its upper end in Missouri, gradually widens as it crosses Arkansas and northern Louisiana, and in southern Louisiana broadens and ends in the marshes bordering the Gulf Coast. The floor of the valley has been built up for ages whenever the river overflowed its banks and deposited its load of sand and silt on the submerged land. During such flood times, too, the river and its tributaries would change course, create lakes, and in other ways carve and shape the land that it had built. Overflows of the Mississippi, now much dreaded floods, were the creators of the bottomland, and by the manner of that creation shaped the forest that now grows there.

### BOTTOMLAND FOREST SWEEPS TO GULF

The bottomland forest sweeps down to the Gulf like the river, changing as it goes. In the upper two-thirds where the land is comparatively well-drained, and flooded only by exceptionally high water, forests of white oaks and hickory or of water oaks and sweet gum predominate. Farther south, and especially in central Louisiana, these give way to a woods of overcup oak and water hickory growing in the "flats", low areas that are overflowed almost every Winter but are dry in Summer. Finally comes the real swamp forest of slender cypress, tupelo, and black gum trees, standing in water that covers the ground most of the year, watery woods that end in the marshes bordering the Gulf. Thus the changing character of the land from the head to the foot of the valley, from high swamp to low swamp, is reflected in the se-

**■ The end of Little Bear Lake, Beset with Cypress Trees—On spring and summer nights this place rings with the calls of innumerable frogs. The water is here mostly covered with floating duckweed.**

quence of forest types and kinds of trees growing in the various situations.

Now, after several decades of logging, this virgin forest has been almost completely destroyed. The one tract that remeans lies along the Tensas River, where that river makes a series of bends or almost closed loops in the western part of Madison Parish. Formerly famous for its hunting, the tract has for recent years been guarded by state wardens, and has been known as the Singer Wildlife Refuge. But logging of the area has already started, and unless steps are taken to preserve an example of the once great forest, the end of these virgin hardwoods is near.

## RELATION BETWEEN SITE AND FOREST TYPE

This Tensas swamp is a good example of a large part of the Mississippi bottomlands, and also is typical of most river bottom swamps to be found in the Deep South; it shows well the close relation that exists between the soil, water, and kinds of trees, between the site and the forest type. The relation fascinates the forest ecologist, and to the experienced woodsman who can read the signs it creates endless variety in the woods. The succession from well-drained bottomland to low, wet swamp that appears in the downcourse of the Mississippi is here re-

**■ The Tensas River in Summer—During late winter the river is five to ten feet higher than in this picture. In summer there is good fishing for large-mouth bass.**

flected in lesser scale, only here the higher ground is along the banks of rivers and larger bayous and the land slopes away from the watercourses. This sounds paradoxical, but it is simply explained. During overflows the muddy, spreading waters immediately slowed on leaving the stream channel and dropped their heaviest burden of sand on the river banks, and only fine silt was carried over to be deposited away from the streams. Thus along the river and bayou banks were built high, well-drained ridges; in some places such elevations which are from five to fifteen feet higher than the low ground, mark the former courses of streams long since disappeared from the shifting pattern.

On these ridges stand the finest trees, water and willow oak and sweet gum. They regularly reach a height of one hundred and fifty feet, and a diameter of four feet or more. In many places these tall trees rise from a tangle of tough vines, their feet in a thicket but their crowns spreading into the open. In others the big trees stand closely together with their tops interlaced into a ceiling, where the black squirrels live, and their columnar trunks are in an open, clean-floored woods.

**■ Tall Timber in the Thick Woods**—Trees in the picture are hackberry, oak, and sweet gum. Palmetto grows in the undergrowth.

**■ A Gigantic Cottonwood Tree**—After reaching an unusual size for a cottonwood, this tree is gradually dying from old age.

■ Site of a Pre-War Cotton Gin—The block for the gin engine was in the little depression in the foreground.

### PLANTATIONS ABANDONED AFTER WAR BETWEEN STATES

Before the War Between the States, much of the land along the Tensas River and the larger bayous was cleared and in cultivation, for the higher ground there was fairly well-suited to farming and the river furnished transportation. During or soon after the war most of these farms and plantations were abandoned, and were never reclaimed. The old fields are now covered with a second growth forest, trees averaging a foot or more in diameter, tall for their thickness and standing closely together. Relics of the past are evident even today, old levees and drainage ditches, cisterns of brick and cement, piles of old brick where houses stood, and occasional rusty plowshares. And tales of those days still are told, probably augmented by the years that have past.

Back of the ridges and old fields, farther from the river and bayous, the ground is lower, and because it is poorly drained, during the winter it is usually covered with from a few to several inches of accumulated rainwater. These places contain a great variety of trees, usually rising from a tangled undergrowth. Big sweet gums, swamp red oaks, and American elms are mixed with smaller trees of red maple, ash, hackberry, cedar elm, wild pecan, and others. Here are some of the largest individuals,—sweet gum, swamp red oak, and honey locust five feet in diameter, and the largest broadleaved tree I have ever seen, a cottonwood nineteen feet in circumference at shoulder-height. These damp, luxuriant woods vary greatly in appearance; here an opening, alive with sunlight and singing birds, where a falling giant, released by decaying roots, smashed its way to the ground, its rotting trunk now surrounded by small saplings fighting to take its place; there a grove of young trees that stand between a head-high thicket, almost impenetrable, and towering forms whose arching branches reach for the blue sky and the wide-winged birds soaring overhead.

### CYPRESS GROWS IN OVERFLOWED "FLATS"

Here and there bordering the bayous are stretches of low ground that are overflowed almost every year. These "flats", as they are called, have a rather monotonous appearance with scaly barked trees of overcup oak and water hickory and an occasional water locust, all rising above an understory of swamp privet, or "crooked wood" as the natives know it. Cypress frequently grow in these flats, but are more common along lake edges and in the cypress brakes or sloughs which hold water most of the year. They are unquestionably the most interesting trees of the region, with their buttressed trunks, the bases sometimes swollen enormously and surrounded with grotesque knees, soaring smoothly upward to the horizontal limbs and feathery leaves.

Some visitors to these woods have said that they have received an impression of a cathredral more here than even in the giant forests of the Pacific Coast. Cathrelral-like or not, these woods are beautiful, not gloomy even though the word "swamp" suggests that. The man standing on the forest floor sees columnar, fray-barked trunks, often clothed with vines, rising until they divide into the tops of arching limbs and leafy branches, where the bright sunlight makes a jumbled design of glinting greens and deep shadows, and where swaying wisps of Spanish moss are outlined against the blue sky beyond. The sun shines through the larger openings between the big trees onto dense stands of saplings which are overrun and bound together with climbing vines. The greatest impression that one receives is of an abundance, richness, and luxuriance of trees.

This magnificent forest shelters an abundance of wildlife. Virgin and little changed by man, it is the natural home for many animals; it is the habitat to which they have become adapted. The most interesting to many outdoorsmen are the deer and turkey, but there are myriads of others, from tiny hummingbirds to gigantic alligators.

### DEER PLENTIFUL THROUGHOUT AREA

Deer range almost everywhere throughout the area, but they are most abundant where dense undergrowth, with several species of rapidly growing vines, grasses, and cane, supplies plenty of forage. In Spring and Summer the traveler in the woods often glimpses them bursting from a thicket or vine tangle, a hiding place to which they had retired for the daytime. During the mating season in Fall and early Winter is the best time to see deer, when they are active throughout the day. In one December in the Singer Tract I regularly saw a dozen deer a day at close range without making any effort to find them. Once a pair passed me, as I stood leaning against a tree, within a pebble toss, the doe ahead and

[Turn to Page 49]

# Why I Am Not Allergic to 'GATORS--UGH!*

## --or am I not?

by
Will Branan

"Percy's dental work . . . appears to be in excellent condition"

The familiar tabby makes a very good household pet and I am not averse to taking milady's pooch for a stroll of convenience, although I am sometimes disturbed by questions of etiquette that would even faze Miss Emily Post.

But I am very much opposed to the introduction of Mr. Gator or any of his relatives into the family circle.

To paraphrase a popular refrain, I do not care for him as a playmate. I am not desirous of having him slide down my cellar door. So far as I am concerned he can stay in his own back-yard, his own puddle or whatever his habitat may be.

It may be instinct or the old sub-conscious at work. Mayhap one of my antediluvian ancestors served as a choice hors d'oeuvre for Mr. Gator before his noon-day siesta.

In any event the tea leaves tell me that I should count ten before poking my head into Mr. Gator's oral cavity.

I am moved to these reflections by a study of Mr. Gator's dental work. It is possible that he neglected his matitudinal teeth-brushing or failed to see his dentist once a year—but if that is the case it has had no perceptible effect on his teeth, which appear to be in perfect condition.

The expression on his face is quite benign, albeit a bit mysterious, as if he were an off-spring of the Sphinx and Mona Lisa, saying, "Why are you afraid, my good fellow? I am not very hungry tò-day. Just a bite here and there—perhaps a nip of the precious posterior."

It is true I never encountered anyone who had suffered the loss of a cross-section of his epidermis through the guile of Mr. Gator, but the fact remains that Mr. Gator possesses all of the instruments with which to perform a neat little operation. And not having the Eddie Cantor or Irvin Cobb facility of realistic narration when it comes to operations, I am perfectly willing to forego the compensating notoriety.

### MR. GATOR MAY BE AN ALTRUIST—LIKE HITLER

Mr. Gator's intentions may be all that they should be, as altruistic as those of Mr. Hitler, but I am still reminded that a certain region is paved with such material. No doubt he would give me the same consideration that he would give an old friend, a relative or member of the family—but I am constitutionally and temperamentally opposed to a journey through his digestive tract, however interesting and exciting that experience might be.

While Mr. Gator seems to prefer a steady diet of crabs, crayfish, shrimp, birds and snakes, he is not averse to eating the members of his own family and when his appetite was particularly good he has even been known to devour his own grand-mother (B. Munch. p. 2339). About the only thing that seems to disagree with his digestion is a whiskey flask, which cuts its merry way through his anatomy after it has been crunched in his jaws.

It is therefore advisable for sportsmen to transport their liquid refreshment in kegs, or barrels, instead of a flask, as Mr. Gator is on our conservation list of picturesque exhibits.

Alligators are more or less aquatic reptiles, belonging to the great sub-class Diapsida, which includes all reptiles that have a skull with two temporal openings separated by a postorbito-squamosal arch and a shoulder girdle with a single coracoid, but no cleithrum. I read that in a book, but even if Mr. Gator has no cleithrum (which may or may not be to his credit) that is after all a question of less importance when he gets his bite as the question whether or no there is a doctor in the house. Preferably a 'gator-bite specialist.

However, Mr. Gator does not appear to be overly fond of man, even in his most succulent form, whereas the dog or hog is more to his taste and he has been known to imitate a floating log in order to deceive these dumb animals. He appears indifferent to the approach of man and has seldom gone out of his way to attack him.

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*Thesis for Ph. D. Univ. of H. K.

It is quite possible that he regards man as an inferior animal, beneath his notice, and as we compare their behavior under certain conditions we cannot escape the conclusion that he may be correct in his judgment.

The marsh-land of coastal Louisiana is one of the ideal habitats of the alligator. Here in the rank growth of grass, water lilies and other aquatic plants one encounters those narrow winding trails that lead to the 'gator hole, which is rarely more than a few yards in diameter. Under the bayou bank beneath the surface of the water will be found the entrance to a large subterranean cave, which is excavated for a distance of fifteen or twenty feet. Here Mr. Gator takes refuge at the stranger's approach.

Your Louisiana angler will wade through a marsh-land stream to cast his lure for the wary bass, giving no heed to Mr. Gator and the ladies of his harem sunning themselves on the bank at the edge of the stream—suddenly they come to life and glide noiselessly into the water.

The angler I am talking about is a doughty soul. He fears nothing here on earth, not even his mother-in-law. He rises with the sun, even wakes up the 'gators, but personally I would rather turn over for another try at beauty sleep and catch my bass at the French Market than take a chance of providing the appetizer for Mr. Gator's breakfast.

### CHARACTERISTICS THAT ARE GOOD—AND NOT SO GOOD

Mr. Gator has some characteristics that man might consider desirable—and some that are not so good. For one thing he has no lips, which is certainly a handicap from the viewpoint of the lip-stick industry. His teeth, especially those of the lower jaw, are exposed and quite prominent, even when his mouth is shut, which suggests to the bystander that it may be the better part of valor to maintain a respectful distance.

Take a good look at those teeth in the picture. They are conical, without roots, and hollowed out at the base. When lost they are replaced—not by store specimens or "dentures," but by an accommodating Nature herself. In fact, Nature has been less kind to man than is generally supposed; but even Mr. Gator may suffer with the toothache, which would explain that saturnine look in his eye.

Mr. Gator is really tongue-tied, for his flabby, wrinkled tongue is adherent for most of its length, and it is difficult to imagine how he would function at a convention when one recalls the recent performance in Philadelphia and Chicago. But the posterior portion of the tongue may be thrown up against the roof of the mouth, just in front of the palentine arches, and serve as a sort of valve, completely closing the passage to the pharynx when the mouth is opened wide, making him a very good submarine model.

It is with the eyes that Mr. Gator really excels. While prominent they do not protrude, as do those of some people. They have vertical slit-like pupils. They may remain open while apparently asleep, which would be most serviceable for one of the parson's extemporaneous efforts.

There are both upper and lower eyelids, and the eyes are further protected under water by a dense, semi-transparent nictitating membrane.

In each upper jaw there are 17 to 18 teeth, 18 to 20 in each lower jaw; also a pit in each upper jaw for the accommodation of a fourth manibular tooth, although this would seem to be superfluous for the ordinary purposes of mastication. Indeed, it must be a pretty tough hombre who would require the extra equipment.

Mr. Gator's skull is broad and flat, with small supra-temporal fenestras; the snout is broad, with bluntly rounded extremity. The body, tail and limbs are completely encased in a tough integument that is divided into quadrangular figures by deep longitudinal and transverse furrows. The back is covered by rows of osseous integumentary plates, each of which is surmounted by a high, sharp ridge.

Probably the most useful part of Mr. Gator's anatomy is his tail. Whether the movement is hurried or leisurely, it is the tail that provides the necessary motive power. His legs are held close to the body so that his progress is not impeded—swerving from side to side, he turns abruptly, then shoots ahead in pursuit of his prey. His agility in the water is remarkable.

### PERFECT TIMING OF JAWS AND TAIL

Mr. Gator's jaws and tail function in close harmony, their timing perfect. When employed as weapons they are quite formidable. While he is unable to turn his head on his stort thick neck to any appreciable degree, he bends his entire body like a bow, and while reaching for his victim with his jaws he sweeps his tail with tremendous force.

It is recorded that an alligator nine or ten feet in length, supposedly dead, once snapped, its tail against a man weighing about 200 pounds, hurling him several feet and breaking one of his legs. The man was picked up unconscious—and after that it was noted that he seemed to care very little for the society of 'gators.

Experienced hunters affirm that the blow from the tail of a large 'gator will break the trunk of a tree several inches in diameter.

### F. H. A. METHODS IN 'GATOR HOME-BUILDING

The female alligator usually builds her nest near the family den or 'gator hole. She adapts herself to environmental conditions and will utilize any material that is available—generally marsh-grass, cat-tails, dead moss and leaves, which are mixed and plastered together with mud. The outside is protected with sticks of odd sizes, small and large.

This nest is usually about four feet in diameter at the base and pyramidal in shape. The cavity in which the eggs are deposited is about one foot in diameter.

When the nest is completed the female deposits her eggs, dropping them from the top. They are frequently found in the lower part of the nest indented or slightly crushed from falling on the first ones, but such accidents do not prevent hatching if the tough inside lining is not ruptured.

As many as 60 eggs have been found in a 'gator nest. The female alligator has piled vegetable material in a rounded heap and matted it down by crawling over it. In the process of fermenting and decomposing this pile of vegetation produces sufficient heat to incubate and hatch the eggs. Moisture is necessary, as the porous shell of the egg allows such rapid evaporation that the embryos would be killed if allowed to dry. The period of incubation is about eight weeks.

The mother alligator leaves a small spiral passage at the top of the nest, invisible from the outside, through which the young may escape.

Mr. Gator is a heat-loving saurain and is rarely seen in cool weather. He is most active during the hot days of July and August. At the approach of Winter he takes refuge in some deep pool or burrows into the mud, where he remains dormant until Spring. Certain Orleanians were inclined to adopt the same tactics during the severe freeze last Winter.

### THE BULL'S BELLOW IS NOT SO MELLOW

The male alligator is unique among reptiles in being able to produce a loud noise or bellow that may be heard the distance of a mile or more. On cloudy days or in the evening of Spring or early Summer one may be startled by this noise that is far from melodious. There is a difference of opinion as to the cause or purpose of this vocal discord. One school of thought contends that it is a challenge or warning to rival bulls, while the other school contends that its object is to attract the attention of more or less susceptible females. In any event it is no lullaby to put the baby to sleep.

At the time of this bellowing fine jets of a musky-smelling fluid are ejected from glands on the chin of the male, and this ejection is commonly associated with the period of courtship.

The voice of the female is less tremulous and irritating; that of the young may be described as a weak grunt, which is easily imitated by hunters who wish to lure the adults from their hiding places.

When alligators in captivity are annoyed (as who isn't?) they show their displeasure by taking deep respiration, inflating their bodies beyond their normal proportions and discharging the air through the throat with a hissing bellow that may be repeated several times a minute.

### THE INSOUCIANT WAYS OF OUR PERCIVAL

It is possible that I am prejudiced against 'gators by my experience with Percival.

Said Percival was named for the eminent herpetologist, Percy Viosca, Jr. It is said that Mr. Viosca knows almost as much about 'gators as that eminent ornithologist, Mr. Stanley Arthur, than whom there is no more eminent herpetologist, or ichthyologist, for that matter. It appears that the relationship of reptiles and birds leads to some confusion here.

Anyway, this Percy was a cutie—that is, when he first arrived in our home. Hardly more than seven or eight inches in length, of indeterminate sex (except by Mr. Viosca or Mr. Arthur) he (or she) was as convivial a fellow as you could ever hope to meet. In time we all became attached to him (or her) and could find nothing too good to say about the little fellow. But Nature will have her way and while the growth of our pet was so gradual that it was barely perceptible it became apparent in time that a transformation had taken place, presumably at the rate of about one foot per annum.

In the course of six or seven years our precious pet had grown very frolicsome and adventurous, possibly because of the enforced celibacy, and it was with some difficulty that we kept him (or her) on the place.

Next came a period of eccentricity, to put it mildly, when our pet was dissatisfied with the diet scheduled by the doctors and in due course disposed of every other pet on the place, including an assorted lot of rabbits, chickens and pigeons, to say nothing of one parrot of variegated hue. Probably tired of hearing her screech "Polly wants a cracker." Thought "Percy wants a Polly" sounded better.

Looking at it from Percy's viewpoint, these other pets should not have intruded their strange personalities and incompatible temperaments in the orbit of an animal whose ancestry pre-dated theirs by several million years.

As he reached maturity Percy developed a bellow that could be heard throughout the town—and was. He was no Lawrence Tibbett, either, and after he had exercised his vocal chords with a few arias we detected a coolness on the part of the neighbors that was more pronounced than the most efficient air conditioning.

But Percy stayed on. He was now about ten feet in length, with a hide so tough that it would have made an oversize traveling bag for the grand kleagle himself. He was on terms of affectionate intimacy with the members of our household and reserved all of his spleen for the neighbors—but sometimes when I observed that baleful gleam in his eye I was afraid he might have a lapse of memory and mistake me for one of the neighbors.

Percy's favorite retreat was the back porch. Here he would sun himself for hour after hour, apparently at peace with the world—then a flick of the tail and a venturesome neighborhood pet was reported missing.

I think the denouement was reached when our rare Pekingese became too inquisitive for his own good, approached within speaking distance of Percy—and it was all over but a plaintive yelp that issued from cavernous jaws.

At long last we found a happy home for Percy in the local zoo. Whenever we are overpowered by a nostalgia of yearning for the company of our pet we can pay a visit to the zoo, being careful to keep the iron bars between our own good selves and Percy's dental work, which still appears to be in excellent condition.

## Louisiana Pioneers In Tarpon Banding

[Continued from Page 8]

are hundreds of other tarpon that will be caught this year, not merely at rodeos, but my non-contest anglers.

The writer would therefore ask all anglers to get in touch with the Conservation Commission, or with him, and every effort will be made to secure for responsible sportsmen additional pliers and bands, to be used during this season. If no more than 200 tarpon a season can be banded off the Louisiana coast, a tremendous step forward, in scientific and economic importance, will have been taken.

### GROUNDWATER INVESTIGATIONS UNDERWAY IN SEVERAL IMPORTANT AREAS

Field work in connection with groundwater investigations conducted by the U. S. Geological Survey in cooperation with the Louisiana Geological Survey is in progress in several sectors of Louisiana this summer. In anticipation of urgent demands for broundwater information to assist in the National defense program, stress is being laid upon the assembling of general information over wide areas. This consists of water level observations, chemical analyses, and geological data.

Detailed investigations begun in 1938 are continuing in the rice irrigation area. Discharge measurements and pumpage records will be complete by September and a quantitative and qualitative report prepared on the water resources of the area.

Preliminary examinations are underway in East Baton Rouge Parish where the large municipal and industrial consumption of groundwater has caused a continued lowering of water levels. It is planned to install water-stage recorders giving continuous records on several key wells in the industrial area north of Baton Rouge. Numerous observation wells have been located in the Florida Parishes to ascertain the areal groundwater conditions and a water sampling program begun.

Detailed work of somewhat local character is being done to assist the U. S. Army Engineers in developing water supplies in various places, particularly at Patterson where a new municipal supply must be obtained. Other detailed studies will assist the City of Alexandria augment its present water supply. Suggestions in regard to the development of a new well field at Alexandria are contained in Louisiana Department of Conservation Geological Pamphlet No. 2, entitled "Preliminary report on groundwater conditions at Alexandria, Louisiana." This is now available to the public.

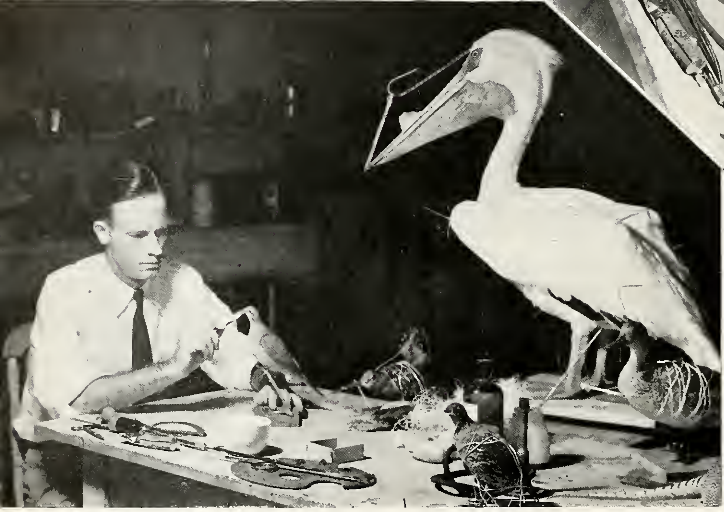
Ae detailed report on the groundwater resources of Grant and LaSalle Parishes is now in manuscript form. This is scheduled for publication this fall or winter.

### BIRD BANDING

Some most unusual flights have been recorded through bird banding. For instance, the long-eared owl is not supposed to be much of a migrant, isn't supposed to travel very far. Yet, a long-eared owl banded at Escondido, California, was shot at Corbell, Ontario—having travelled a distance of more than 3,000 miles—across the country from South to North and almost across the country from West to East.

# The Art of Taxidermy Comes Into Its Own

by
Isaac D. Chapman



**Above, Edouard Morgan, Conservation Department taxidermist, is shown, taking the first step required in the reproduction of a bird.**

**Left—Here is the completed specimen after the drying process. The taxidermist is shown applying the finishing touches. The bill and feet have been colored as in natural life and the bird has been mounted on a stand. Under proper conditions bird mounts can last indefinitely.**

The Greeks had a word for it! They called it "taxis-derma". (If you understand Greek—pardon our southern accent.)

In the Greecian language taxidermy means "order, arrangement or preparation of the skin". Be that as it may, taxidermy in modern times plays an important role in conservation activities, particularly from an educational viewpoint.

Haven't you noticed how life-like and realistic looking are those specimens of birds and wildlife that you've seen in museums and libraries and haven't you at one time or another wondered how it was possible to preserve and keep them so alive looking?

Well, the answer is taxidermy, and beyond that is an interesting and intriguing process, painstaking in its nature, of reproduction and preservation of fish, game and wildlife for educational, decorative and historical purposes.

The Department of Conservation maintains a taxidermist division as a part of its educational activities. Most of the finished specimens are put on display in the Conservation Museum located on Royal Street in New Orleans. Annually thousands of visitors from all parts of the state and nation visit the museum to view and study the several hundred interesting exhibits. Included among these are specimens of practically every type of bird, fish, game and wildlife that can be found in Louisiana.

There are over 700 exhibits in the Conservation museum, including two natural habitat groups of Quail and Woodcock, all reproduced by the taxidermy department. Included in this number are over 275 different species of birds, large and small, in colors forming every shade of the rainbow. For example, there are such rare specimens of birds as the Ivory Billed Woodpecker, Wood Stork, Bullock Oriole, Inca Dove, Grooved-Billed Ani, Holboell Grebe, Whooping Crane and others.

There are specimens of all types of fish, too, that are available in the lakes, bayous and rivers of Louisiana. They range in all sizes and colors from the small Sun Fish, War Mouth Bass, Baby Tarpon, to a 2600 pound Saw Fish, sixteen and one-half feet long, which was caught at Shell Beach several years ago. Other interesting and unusual exhibits of fish include a Tarpon, caught in 1938, weighing 129 pounds, a Leather Back Sea Turtle, caught in the Gulf of Mexico in 1937, weighing 700 pounds.

Among the most interesting animal exhibits in the museum is a 12-year-old Black Bear, weighing 500 pounds, which was captured in St. Martin Parish in 1932. Then there are specimens of Deer, Buck, Doe, Otter, Mink, Weasel, Beaver, Wolf, Armadillo, and in fact every type of wildlife that can be found in Louisiana.

Under proper atmospheric conditions, which means what is known as the three "d's" of museum exhibits, no dust, dampness and dermestes, it is possible to preserve taxidermy specimens almost indefinitely.

The art of taxidermy dates back to the beginning of civilization itself. Primitive man used the skins of animals to protect his body from cold, and as skins must be softened to be worn, he must have rubbed them with earth, ashes and fats to make them pliable. As evidence of this fact, it is pointed out that crude flint "knives" and "scrappers" have been found in caves.

Later the Egyptians and Mexicans embalmed bird and animal pets along with human beings. Examples of them can be found in the larger museums.

The idea of "stuffing" birds for decorative or display purposes is not over 400 years old. The first positive records is that of the Hollanders in the early sixteenth century. A nobleman of Amsterdam had a large collection of live birds from the East Indies. One night, these birds, through the carelessness of an attendant, were suffocated. The nobleman was overcome with grief. The next day all the scientists and chemists of the city were summoned to devise a method of preserving this valuable collection. It was decided to skin the birds, stuff them with spices and wire the legs and wings to resemble life.

In late years great improvements have been made over the old methods. Formerly, the expression "stuffed" was literal. Saw dust, moss, straw, rags and paper were all used as filling. Lifelike appearance and accurate conformation could not be obtained, and after a few years these specimens became truly a study in "unnatural history".

Today museum exhibition and taxidermy can be divided into four distinct classes of work; birds, mammals, fish and accessories. Each involves a somewhat different process, and it takes from one day to two months to complete the finished project, depending on the nature and size of the specimen.

There are two general methods of fish taxidermy, one is "stuffing" the actual skin, the other is casting in plaster, celluloid, paper or other suitable medium. The casting process is by far the most satisfactory for museum exhibition and the most widely used, because the results are permanent as they cannot be affected by insects or dampness. Few persons realize that a mounted fish is not stuffed, but actually is a painted plaster of Paris cast of the original fish.

Incidentally, young Edouard Morgan, taxidermist for the Conservation Department, was one of the first in the South to realize the possibilities of preserving fish by using plaster of Paris. He learned the idea from Mr. Carl Christensen of the Los Angeles Museum while the latter was on a visit to Louisiana.

In casting the first step is to remove all slime from the fish by washing in alum water. Next it is laid on damp sand and posed, after which the sand is built up until only the upper half of the fish is exposed. Plaster of Paris is then poured over the exposed half to form one side of the mold. Then the fish with half mold attached is removed from the sand, turned over and the other half cast. After the plaster is hard, the mold is split open, and the fish is removed, leaving two half molds. The inside of each half of the mold is then varnished with shellac and oiled. While this coating is allowed to dry, cast is made of the inside of the fish's gaping mouth. Plaster is then poured into each half of the prepared mold for final casting. When this has set, the outer shell of the mold is very carefully cracked away. The fins are carved from sheet celluloid, and fitted into the cast. The two halves are then joined, the seam is filled with plaster to hide the joint. The mouth parts, cast separately, are inserted and plastered into proper place. Glass eyes are colored and inserted and after the cast is thoroughly dry, the body and fins are painted and varnished and the finished product is then placed on a final mount. The colors of fish vary so much that it is often difficult for the artist to strike a happy medium that will satisfy all fishermen. Water conditions, temperature of the water affects colors of fish.

Snakes, turtles and frogs are all cast and reproduced in essentially the same manner as fish. In casting every de-

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■ **This is a real fish story! Few persons realize that a mounted fish is not stuffed, but actually is a painted plaster of Paris cast of the original fish. Here are the most important steps as illustrated by Edouard Morgan, Conservation Department taxidermist.**

■ **(1) After washing in alum water to remove slime from skin and scales, the fish is laid on sand to prop it into desired position and expose half of the body, after which Plaster of Paris is poured into the exposed half. (2) The fish is then turned over and (3) the other half of the mold is poured. (4) The mouth parts are cast separately and (5) here is the finished product, as the final touches of painting the body and fins is applied.**

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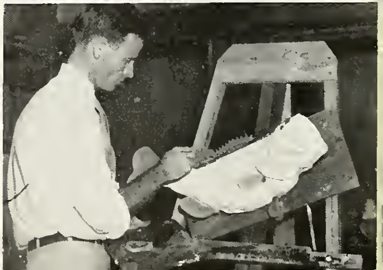

tail of the specimen is faithfully reproduced and there can be no shrinkage or distortion in the final mount.

In the reproduction of birds, a somewhat different process is used. A taxidermist must have some technical knowledge of surgery, as is evidenced by following the procedure that is necessary for preserving birds.

A major operation is performed in reproducing a bird. First, an incision is made down the breast, the body is removed, leaving the leg and wing bones and skull attached to the skin. An artificial body is then made from soft excelsior or carved in balsa wood. The wing, leg bones and skull are held together by wire and powdered arsenic is dusted over the entire inner surfaces of the skin. The artificial body is placed in the skin and wires from the wings, legs and skull are attached to the body. The incision in the breast is sewed together and glass eyes are inserted. The specimen is manipulated into a lifelike position, placed on a temporary stand, and wrapped lightly with thread to hold feathers in place. Then it is set away for several weeks to dry. After the drying process, the wrapping is removed, the bill and feet are colored as in life and the completed specimen is mounted on a stand or placed in a natural habitat group. Bird mounts will last indefinitely if kept in a dust and insect proof case and not exposed to dampness or direct sunlight.

Mammal work, the reproduction of wildlife such as bears, deer, beavers, etc., is much more difficult and complicated than fish or birds. In reproducing large animals, the first step is to take measurements of every part of the body. The animal is then skinned out and salted, and this requires a nice piece of surgery. A plaster cast is then made of the body and skull to serve as models, and a life size clay model is made. The skin is tried on and if it fits perfectly, a plaster mold is made of the clay model. If it doesn't fit perfectly, the same work has to be done over until it is just right. After the plaster mold is completed, a manikin is cast from heavy paper and glue after which glass eyes are placed in the manikin. After treating with an arsenic paste the skin is slipped onto the manikin and pinned and glued into place. With this method every muscle, bone and contour is faithfully reproduced and the finished product is lifelike in every respect. Very small animals are reproduced in the same manner as birds.

Accessory work in museum exhibition covers a wide field. The most attractive and educational manner in which to display wildlife is by placing them in natural habitat groups. This means, the creating, by artificial trees, leaves, ground work and painted back-grounds, a section of the natural environment of the specimens.

The first step necessary is to photograph or sketch the section of woodland, swamp or prairie that is to be reproduced. Next, color plates are made of the trees, grasses and ground and samples of each are collected and brought to the taxidermist laboratory. In the laboratory molds are made of the leaves, grasses, etc., and they are reproduced in celluloid, wax or paper. In some cases large trees are artificially reproduced from castings of the bark. Some grasses can be pickled and recolored. The background is usually made in the form of a shell so that no corners will be visible to the spectator. This background is painted from the photographs and sketches and blended to match the artificial ground, leaves and grass. Additional specimens are often painted in to give depth and realism to the group.

When completed, lights are carefully arranged and the whole display is encased. Usually there is only a comparatively small window in the case so that from the spectators' viewpoint there are no seams or corners to detract the eye, giving the illusion of being suddenly removed from the exhibit hall to the woods, marsh or prairie that has been portrayed. Very few people realize the great amount of detail work that goes into the construction of these groups. Thousands of leaves alone are necessary for some groups and each leaf must be made and colored by hand.

Many of the exhibits now on display in the Conservation museum have been produced by Edouard Morgan, who has been taxidermist for the Conservation Department for the past three and one-half years. Although Morgan is considered an expert in his line, it was purely through accident that he came to take up the profession.

Bad health forced him to forsake the city for the country where he could be outdoors most of the time. For two years he lived in Mandeville and spent most of his time in the woods and on the rivers, hunting and finishing and generally taking things easy. With a desire to preserve some of the specimens he captured as a reminder of the hours spent in those woods and bayous, he started experimenting as a taxidermist, using a pocket knife and what natural supplies were available in the woods. His finished products must have been very crude, but nevertheless it gave young Morgan the inspiration and desire to become a taxidermist.

Upon returning to New Orleans he went to work at the Louisiana State Museum under Dr. Robert Glenk. For seven years after that he studied taxidermy and museum exhibition, and over three years ago he was put in charge of the taxidermy division of the Conservation Department.

Today Morgan is more enthusiastic over the art of taxidermy than he was years ago in the woods near Mandeville where he first got the inspiration. In fact he thinks taxidermy is just coming into its own in the South. There has not been much development of this art in the Southern states, but as people are beginning to realize the importance of museums for educational and historical purposes, they are showing a greater interest and appreciation for the art of taxidermy, for after all museums are the results of taxidermy. And so taxidermist Morgan sincerely believes that there is an unlimited field for taxidermy development in the South and that the parade of progress in this field has already started.

## DOUBLE TROUBLE

Recently, the Bureau of Biological Survey reports, an Indian justice of the peace said, "$10 and $8.50 in costs," and Prosecuting Attorney Glenn S. Mock added another conviction to his record while Defendant Glenn S. Mock dug into his pockets for the cash.

Prosecuting Attorney Mock is from English, Inc.; so is the defendant. In fact, they stand on the same feet. Prosecutor Mock filed an affidavit against Citizen Mock for killing a Canada goose with a rifle. In court he (the hunter) pleaded guilty to charges filed by himself (the prosecutor). Though Mock is prosecuting attorney for Crawford County, apparently he did not know that hunting wild geese with a rifle was against Federal migratory waterfowl regulations. An account of his hunting experience was published in a county newspaper that was read by a Survey game-management agent. The agent informed the county official that he had violated a State as well as a Federal law, and Mock brought himself to court.

Facetiously inclined persons are to be discouraged from remarking that this might have been a mock trial.

## WATER, WATER, ETC.

Birds and animals often starve to death in the midst of plenty . . . because they do not know that unfamiliar foods are good to eat . . . for instance, it took two or three years for quail in Florida and Georgia to find out that millet and other grains, planted for them, were good to eat.

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Swallows, unlike most birds, travel by day when migrating due to the fact that they feed on the wing.

# Recent Legislation Affecting Mineral Development of Public Lands

by
William A. Romains*

During the last gubernatorial campaign Governor Sam Jones promised certain changes in the methods of handling State owned lands. The following article will attempt to show how changes made by the 1940 Legislature in the Mineral Board Act (Act 93 of 1936 as amended by Act 80 of 1938) are a step toward the fulfillment of this promise.

**Act 71** of the regular session of 1940 amends Sections 9, 10, and 20 of Act 93 of 1936, and repeals Sections 15 and 16 of the same act.

Section 9 of Act 93 of 1936 has been amended to give the State Mineral Board the authority to enter into unitization or pooling agreements. This has the effect of placing the State on the same basis as an individual, and makes the State as amenable to any unitization or pooling order of the Commissioner of Conservation as any individual. It means, for instance, that when an order calls for a twenty-acre spacing rule, the State, having a bayou in the pool or field, can only get its fair share of the oil, depending on the relation of the area of the bayou to the area of the whole pool or field.

When the State is bound to observe drilling units, the drilling of unnecessary offsets, with the consequent waste, will be eliminated.

Section 10 of Act 93 of 1936 has been amended to enlarge the duties of the Register of the State Land Office in regard to State leases. The Register will be the custodian of all records pertaining to State leases, will receive all moneys, and will sign all necessary division orders, after the same have been approved by the State Mineral Board.

Section 20 of Act 93 of 1936 has been amended to show precisely what disposition is to be made of the funds received by the Register from the proceeds of State leases. It specifically provides that ten (10%) per cent of the minimum royalty shall be deposited in a special fund to the credit of the Parish in which the production is had, said fund to be known and referred to as Road Fund.

Sections 15 and 16 of Act 93 of 1936 have been repealed. These sections dealt with a daily report covering production from State leases, and the penalty for failing to comply with this provision. These sections were repealed because they placed an undue burden on the various operators. There is a monthly report which accompanies the royalty checks which will suffice.

Act 92 of 1940 amends Sections 6 and 7 of Act 93 of 1936.

Section 6 has been amended to allow the Mineral Board, in its discretion, to conduct geological or geophysical exploration before it leases an area after applications for said State owned area have been made, as in the past.

**Editor's Note.—Louisiana ranks third among the oil-producing states in its reserves of potential production, according to recent estimates. Owing to the State's ownership of large areas of land and water bottoms subject to lease for mineral development there is keen interest in the changes made by the 1940 Legislature in the Mineral Board Act, affecting methods of handling these public lands.**

The Board may also decide to advertise all or any portion of the area asked for. But, in any event, no area greater than five thousand (5,000) acres can be included in one application or one lease.

The advertising procedure remains the same—namely—the publication in one New Orleans paper, the official Parish paper, and the Baton Rouge State-Times, for a period of fifteen days, and providing that each of the advertisements need not appear oftener than once a week. The Board will also continue to send mimeographed copies of the applications to those whom it thinks would be interested. As in the past, the Board may advertise an area without first receiving an application for the same.

Section 7 has been amended to allow the Board to reject any or all of the sealed bids, or to grant a lease on a smaller portion than that originally advertised, or, after the sealed bid or bids have been rejected, to then proceed to immediately and publicly offer for competitive bidding all or any designated portion of the advertised property for leasing upon such terms and conditions as appear most advantageous to the public interest; provided that such public offering shall be subject to the right of the Board to reject any or all bids, and no lease shall be granted in response to such public competitive bidding for a lesser bonus, delay rental, or royalty payment than was offered in the most favorable written bid submitted for the same property. The minimum royalties established under Act 93 of 1936 still remain.

**Act 162** of 1940 is what is known as the State Agencies Leasing Act. It defines the various State agencies coming within the scope of the act, and establishes the procedure for the leasing of lands coming under their jurisdiction.

Briefly, a State agency can follow one of two methods of leasing: (1) It can lease the lands itself, by following the procedure as laid down for the State Mineral Board; or it can (2), request that the Board lease for them; but, in either event, the final lease must be approved by the Board to make it legal and binding.

**Act 73** of 1940 places all lands of State Banks in liquidation under authority of the State Mineral Board. It simply states that, after a State Bank in liquidation has leased lands under its jurisdiction, approval must be had from the District Court having jurisdiction and from the State Mineral Board before the lease can become valid.

In the main, the above are the changes in the State Mineral Board act. However, there is one other change embodied in Act 47 of 1940. This act is the so-called Reorganization Act, and has the effect of including the State Mineral Board as a subdivision of the newly created Division of Minerals, which will be directed by a three-man Board of Minerals. This Board will also assume the functions of the five-man Board, as created by Act 93 of 1936.

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* Field Supervisor, State Mineral Board.

# COTTON VALLEY UNITIZATION AND PRESSURE MAINTENANCE

by
W. H. Hager

**Christmas Tree used in Cotton Valley field.**

**Pressure maintenance plant in Cotton Valley field.**

The Cotton Valley operators and land owners signed a unitization agreement effective June 29, 1940.

This project was made possible by an order issued July 1, 1940, at New Orleans by Major B. A. Hardey, Commissioner of Conservation for the State of Louisiana. This agreement provides for unitized field development, production and pressure maintenance and is regarded by the leaders of the petroleum industry as a most constructive move. Pressure maintenance and the necessary unitization have been intensively studied by the Cotton Valley operators, company engineers, and the Conservation Department of Louisiana for more than three years. Involved in this agreement are thirty operators and six hundred or more royalty owners. Included among the operators who have entered into this unitization agreement are Fohs Oil Company, H. L. Hunt, Magnolia Petroleum Company, W. G. Ray Drilling Company, North American Oil Company, The Ohio Oil Company, A. G. Oliphant Oil Corporation, Union Producing Company, Woodley Petroleum Company, Superior Oil Company, Stanolind Oil and Gas Company, and others.

A pressure maintenance plant will be built which will cost approximately two million dollars and will process 150,000,000 cubic feet of gas daily, recovering 10,000 barrels of distillate. It is proposed to have this plant in operation by the first of the year 1941. Bids for the construction of the plant and the pipe line gathering system will be received by the Cotton Valley Operator's Committee on August 10th.

For the next few years pressure maintenance for the Cotton Valley field will consist of returning the gas from the Bodcaw and "D" sands to the same sands for the purpose of keeping reservoir pressure and energy as near initial conditions as possible. This will involve separation of gas and distillate at pressures above twelve hundred pounds per square inch and then by one stage of compression raising pressure of the gas to approximately 3000 pounds per square inch, sufficient for the input well requirements.

**Benefits:**

1. **Will increase return to State of Louisiana in taxes over two million dollars at the present rate of taxation from Bodcaw and "D" sands alone.**
2. **Will increase ultimate distillate recovery 50 per cent.**
3. **Will increase life of field approximately 18 years.**
4. **Will retard encroachment of edge and bottom water.**
5. **Will prevent waste of gas in recovering distillate.**
6. **Will eliminate drilling of unnecessary wells which would have cost $10,500,000.**
7. **Will make possible recovery of gasoline content of gas from Bodcaw and "D" sand oil wells which is now being blown to the air.**
8. **Will permit recovery of 15 per cent stock tank vapor loss of distillate wells.**
9. **Will prevent the necessity of selling dry gas at distress price.**
10. **Will assist in maintaining an oil and gas reserve at small relative cost.**

While the pressure maintenance plant is under construction the field's allowable oil and gas production will be set up according to practice which has been used since 1937. This method of allocation is governed by acreage, bottom hole pressure, and gas-oil ratio factors.

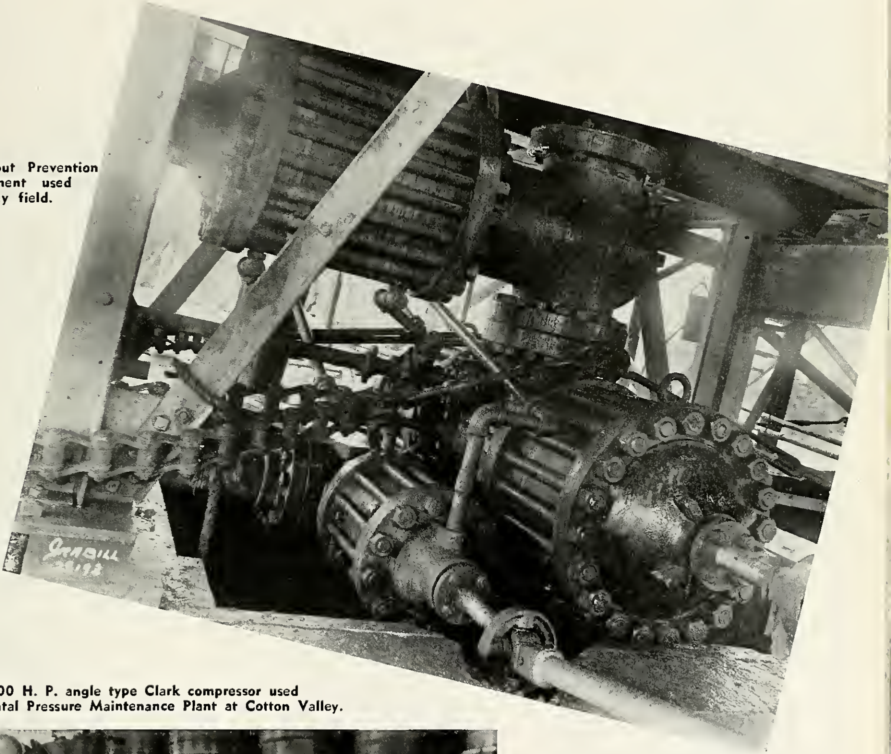
During the time the pressure maintenance plant is being constructed a small experimental recycling plant will return gas to the Bodcaw sand at the rate of about 15,000,000 cubic feet per day.

### The Cotton Valley Field

The Cotton Valley field, Webster Parish, Louisiana, is an anticlinal structure located on the Northeast flank of the Sabine Uplift. It is an elongate and symmetrical fold, the structural axis extends Northeast and Southwest for a proven distance of five miles and the transverse axis is four miles long. There is a minimumu closure of 600 feet indicated in the principal producing horizon, the Cotton Valley formation of Cretaceous age, the lowest structural contour of the field embracing an area of approximately 12,000 acres.

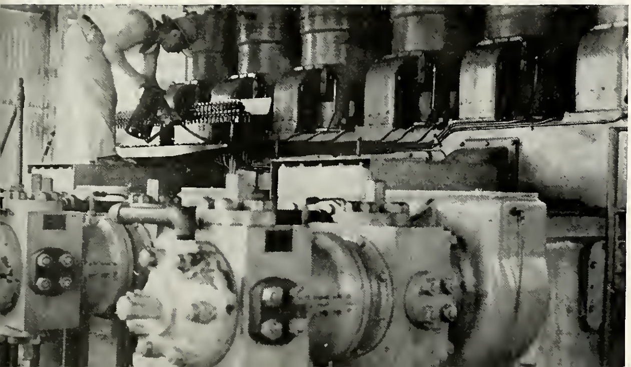
This field was discovered in 1922 with completion of R. D. Webb, Merritt #1, in the Upper Cretaceous Blossom sand. The Blossom sand, productive in many Northern Louisiana oil and gas fields, was the main oil and gas horizon in the Cotton Valley field until 1926 when gas was discovered in the Lower Glen Rose Anhydrite Zone. In 1928 oil was found in the lenticular sands below the Anhydrite Zone.

**Experimental maintenance plant in Cotton Valley field.**



**Type of Blowout Prevention Control equipment used in Cotton Valley field.**

**Below—A 600 H. P. angle type Clark compressor used in Experimental Pressure Maintenance Plant at Cotton Valley.**



Dissipation of these shallow horizons lead to deeper drilling resulting in discovery of the Holloway oil sand just below the top of the Travis Peak formation at a depth of 5535 feet (Ohio Oil Company, Holloway #6) with an initial production of 504 barrels of 45 gravity brown oil daily. The deep Bodcaw sand gas-distillate horizon was discovered in the

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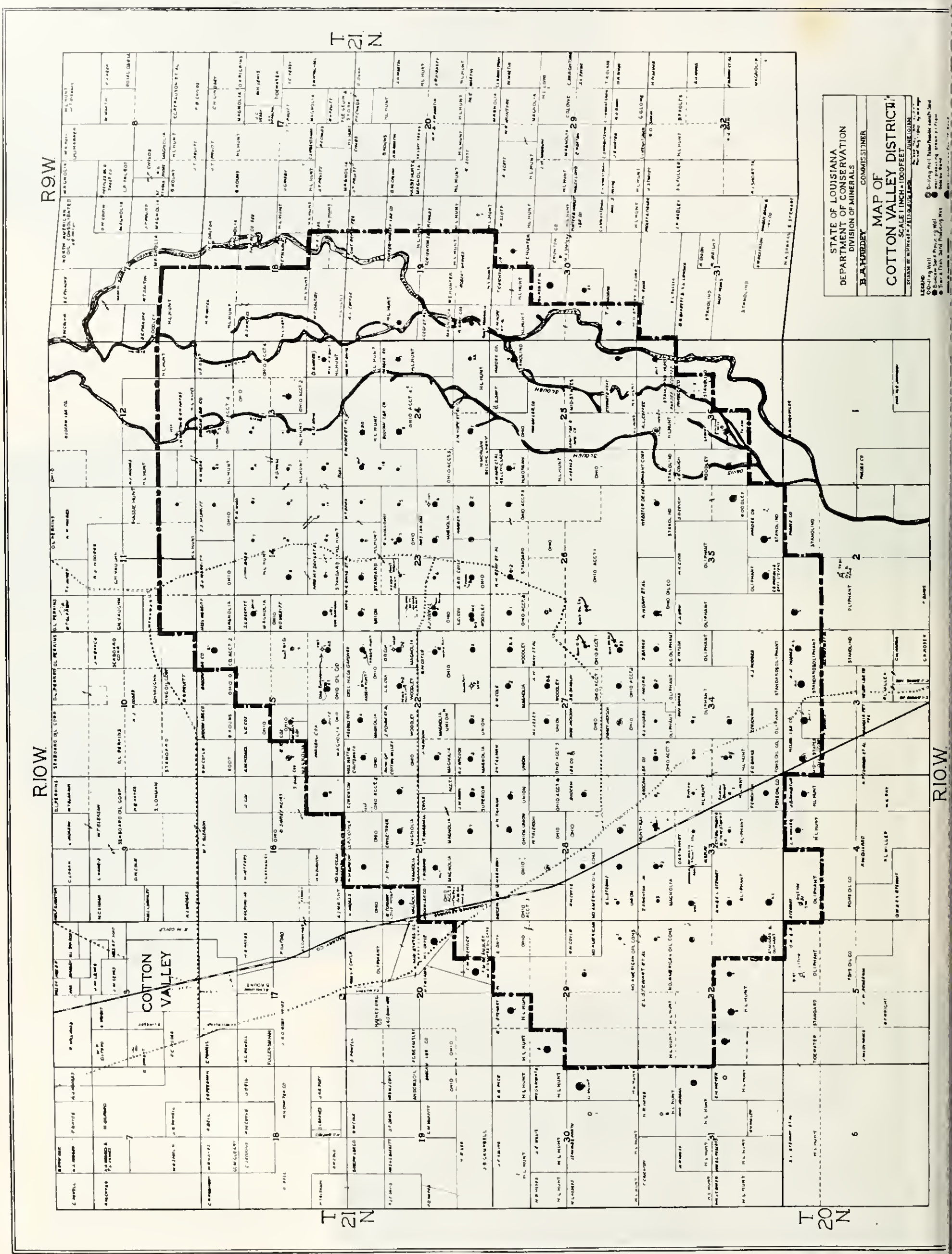

STATE OF LOUISIANA
DEPARTMENT OF CONSERVATION
DIVISION OF MINERALS
B. A. HARDEY
COMMISSIONER
MAP OF
COTTON VALLEY DISTRICT
SCALE 1 INCH = 1000 FEET
JUNE 10 1934
LEGEND
Drilling Well
R9W.
R10W.
T 21 N
T 20 N
COTTON VALLEY

same well but was not produced. The Ohio Oil Company completed Bodcaw Lumber Company, Account #4, well #1, Section 28, T. 21N R. 10W, January 11, 1937, as the first producing well in the Bodcaw sand at total depth of 8196 feet. This well had an initial daily production of 312 barrels of distillate and 3,744,000 cubic feet of gas on ⅜ inch choke, tubing pressure 2800 pounds per square inch and casing pressure of 3200 pounds per square inch, gas-distillate ratio 12,000 to 1.

As mentioned previously the Bodcaw sand and the "D" sand are at present the sands affected by the operation of the unitization agreement. There are at this time 77 distillate wells in the Bodcaw sand and 35 brown oil wells in the Bodcaw and "D" sands. A very few additional wells will be required in the distillate area.

The porosity of the Bodcaw sand varies between 15 per cent and 20 per cent and its permeability is very consistent. This blanket sand may be depended upon for either water white distillate or dark oil in any well drilled within the 8,420 foot sub-sea contour. The Bodcaw sand for the most part is distillate bearing but there exists a ring-like band of brown oil along the lowest closing contours which is not over five hundred feet wide. Also in the Cotton Valley formation, but overlying the Bodcaw sand, are four blanket sands called in order of depth "A", "B", "C", and "D", sands. Of these four all of which are thinner and less porous than the Bodcaw sand the "D" sand alone has proved to be an important oil and gas producing horizon.

The Union Producing Company Davis #2, located in Section 22, T. 21N, R. 10W, was the first well to be placed on production in any horizon below the Bodcaw sand. This well was completed on March 19, 1937, in the deep Davis sand found from 8520 feet to 8544 feet for an initial production of 624 barrels of distillate and 7,872,000 cubic feet of gas, ⅜ inch choke, casing pressure 3175 pounds per square inch and tubing pressure of 3085 pounds per square inch. Later this well was plugged back to the Bodcaw sand in order to prevent drilling unnecessary offset wells.

A comparison of the core samples, time drilling records, and electrical logs of wells drilled below the Bodcaw sand indicates also that other blanket sands of commercial importance lie below this sand. These lower sands are encountered at depths of approximately 225 feet, 320 feet, 380 feet, 430 feet, and 460 feet below the Bodcaw sand. The experience operators have had with "kicking" wells also establishes definitely the presence in these sands of high pressure gas.

All of the sands in the Cotton Valley formation horizon constitute a distillate reservoir in which nearly the entire productive area is occupied by distillate bearing gas, carrying only a ring of brown oil approximately ⅛ of a mile wide. The average initial gas distillate ratio in any of those Cotton Valley formation sands will be about 12,500 cubic feet of gas to one barrel of distillate. The hydrocarbon products are mostly in the gas phase in the reservoir. However the water white distillate recoverable in conventional separators is worth three times as much as the gas.

The original bottom hole pressure in the Bodcaw sand wells was 3950 pounds per square inch and this pressure was found to be uniform throughout the field. The bottom hole pressure in the Bodcaw distillate wells is at present, July 1940, 3500 pounds per square inch. The initial and present bottom hole temperature is 238° F. The existence of any definite liquid column has not been established and generally the column in the well is regarded as a heavy vapor.

Back pressure tests very carefully taken in 1938 established a potential open flow of 200,000,000 cublic feet of gas per day and an absolute open flow above 400,000,000 cublic feet of gas per day for the average well. The present open flow potential has declined 11 per cent from the 1938 figure.

At the present time water white distillate from this deep high pressure and high temperature horizon is condensed in the conventional separators at pressures ranging from 350 pounds to 425 pounds per square inch. Only the heavy constituents of the gas are trapped. Numerous tests reveal vapor loss of 15 per cent to 20 per cent from the stock tanks. Attempts at bottom hole sampling have been unsuccessful due to extreme heat and pressure so we can only interpret the reservoir phase by our knowledge of other similar fields and by studies of the surface phases.

the heavier hydrocarbons which compose the liquid distillate production are condensed into their liquid state by reduction of the pressure vapor. The liquid hydrocarbons trapped in the Cotton Valley formation will vary with temperature and pressure changes as long as these factors are within the retrograde condensation range which is generally between 700 pounds per square inch to 4000 pounds per square inch.

This process of condensation in the reservoir of the heavier hydrocarbon constituents, resulting from the reduction in pressure as in the Cotton Valley deep reservoir, is the reverse of the conditions encountered in shallow, low pressure, and low temperature reservoirs where the lighter hydrocarbon constituents are found and which are more volatile.

Experimental separation tests made on Cotton Valley Bodcaw sand hydrocarbons show that the higher the separator operating pressure the less fluid was produced and the resultant higher gasoline content of the gas. The results of this work further indicated retrograde condensation would take place within the reservoir if a high bottom hole pressure was not maintained by returning gas to the formation. Without retaining high bottom hole pressure this retrograde condensation would take place in the productive sand and the liquid not being of sufficient volume to settle to lower part of the geological structure as a free hydrocarbon liquid would wet the sand grains, and the surface tension of the liquid hydrocarbon constituents on the sand grains would be so great that no differential pressure then available would force them to the well bore.

Without pressure maintenance a loss is conservatively estimated at 50 per cent of the original recoverable distillate content of the Cotton Valley field.

**Characteristics of Bodcaw Sand**

| | |
|---|---|
| Depth of producing Bodcaw sand | 8100 feet plus or minus |
| Thickness of Bodcaw sand | 35 feet average. |
| Producing area of Bodcaw sand | 12,000 acres. |
| Initial content of Bodcaw sand | 591,250,000 M. C. F. of gas. |
| Delivery capacity of Bodcaw sand well | 200,000 M. C. F. of gas per day. |

**Abandonment Conditions**

| | |
|---|---|
| Delivery capacity per well | 100 M. C. F. of gas per day. |
| Wellhead pressure | 64.5 pounds per square inch absolute. |

47,000,000 barrels of distillate—estimate of original content of Bodcaw and "D" sands.

The pressure maintenance plant at Cotton Valley will prevent a reservoir pressure decline at a too rapid rate thus preventing valuable constituents such as naphthas and motor fuel fractions from being precipitated in the producing formation due to retrograde condensation. By retrograde condensation is meant that

The Cotton Valley unitization and Pressure Maintenance Agreement, making possible the operation of an efficient recycling plant, is well recognized by leaders in the petroleum industry as an important step not only to the Cotton Valley operators and royalty owners but to the petroleum industry as a precedent in establishing similar agreements in many other areas where pressure maintenance is imperative.

# Louisiana Geological Survey

During the summer of 1940 three research geologists and ten assistants are employed in conducting field surveys for the Louisiana Geological Survey. All of these men are graduate students at the Louisiana State University's School of Geology, who are in the field primarily to conduct original investigations for advanced degrees. The Survey benefits to the extent that it can conduct its program at a very low cost by utilizing graduate students. At present Caddo, Webster, Red River, De Soto, Sabine, Beauregard, Allen, Evangeline, and East Baton Rouge Parishes are being actively investigated.

The geologic mapping of Webster Parish, begun in 1939 by Mr. James Martin, is now more than half completed and will be finished by September. An extensive study of the Claiborne group of formations exposed in this parish has been made. Publication of this material will aid considerably in the correlation of this group in the Gulf Coast. All four of the Pleistocene levels described in 1938 by H. N. Fisk of the L. S. U. School of Geology have been identified in the area, thus adding further evidence of the existence of these levels in Louisiana.

Geologic investigation of De Soto and Red River Parishes was initiated in 1939 by Mr. Grover Murray. Already three-fifths of the area has been mapped. The stratigraphic sequence (chiefly Sabine group) has been determined in detail and traced across De Soto Parish into Texas on the west, Sabine Parish on the south, and Natchitoches Parish on the southeast. Topographic profiles and geologic sections have been constructed along all of the main roads. Foot traverses have been conducted over the less accessible parts of each parish in order to obtain first hand knowledge of the geologic sequence exposed. Septarian concretions containing macro-fossils were found in southeastern De Soto Parish. Such a discovery is especially interesting since the sediments are supposedly of Wilcox age. Micro-fossils were found in the clays and silts stratigraphically below the zone of fossiliferous concretions. Such data have not been described in the geologic literature of this state and should throw much light on the interpretation of the age of the sediments exposed in and adjoining De Soto Parish.

### WORK IN BEAUREGARD, ALLEN AND EVANGELINE

Preliminary field work has been started in Beauregard, Allen and Evangeline Parishes by Mr. Wilbur C. Holland. This work will ultimately consist of a detailed interpretation of the Pleistocene deposits which cover nearly all of the area and a compilation of the available subsurface data. The continued interest in the Sparta-Wilcox trend makes such a subsurface study highly desirable.

In May 1940 a preliminary investigation of the lignite deposits in Louisiana was begun. Much of the lignitic material used in the United States was formerly obtained from Germany. Since this is no longer possible an increasing interest has been evidenced in the type and extent of the lignite deposits of Louisiana. Samples are now being collected and described from a large part of northern Louisiana where this material occurs at the surface. The report contemplated for publication will contain such field data as location, thickness, extent, overburden, etc. It will also contain laboratory analyses giving the various chemical and physical characteristics of the samples.

Field work has now been completed in East and West Carroll Parishes, Bienville and Jackson Parishes, Natchitoches Parish, and Vernon Parish. Final work such as writing of manuscripts, drafting of base maps and illustrations is now under way. The report on Bienville and Jackson Parishes will go to press by the first of the year and the Vernon Parish report soon thereafter. Upon publication of these various reports much useful data will be made available to the public. Such data should directly assist in developing the mineral resources of the state of Louisiana.

### BULLETIN ON RAPIDES AND AVOYELLES

Louisiana Dept. of Cons. Geol. Bull. No. 18 entitled, "Geology of Rapides and Avoyelles Parishes, Louisiana," by Dr. H. N. Fisk is now in press. It contains a colored geologic map on a scale of one inch equals one mile. Detailed discussion, maps and cross-sections are included for the Eola and Cheneyville oil fields. Revisions in the geologic nomenclature applied to the various stratigraphic units encountered in the area are suggested with the intent of relieving the confusion that exists in correlating these various units in the Gulf Coast.

Louisiana Dept. of Cons. Geol. Bull No. 19 entitled, "Sand and Gravel Deposits of Louisiana," by T. P. Woodward and A. J. Gueno is also in press. Insofar as sand and gravel deposits are concerned this bulletin is the most comprehensive published in this state. Some 285 detailed maps are included which give the location, thickness, extent and type of deposit. Approximately 275 chemical and mechanical analyses of samples collected in the field are listed. A paper on the subsurface Pleistocene of south Louisiana by J. W. Frink is also included in the bulletin. Although this paper is of a speculative nature it should stimulate considerable thought toward solving the Pleistocene problems of Louisiana.

The printer has also recently received a manuscript by Dr. J. H. McGuirt entitled, "Tertiary Bryozoa of Louisiana." This paleontological report will undoubtedly be received with much enthusiasm. Bryozoa have long been considered as a possible means of correlation but little detailed work has been devoted to their description and stratigraphic range in the Gulf Coast. Dr. McGuirt's work is a step toward filling this need.

### ARCHAEOLOGICAL SURVEY

During the year of 1939-40 the Archaeological Survey with the assistance of a state-wide project of the Work Projects Administration has been engaged in the excavation of five Indian village sites in various parts of Louisiana. These range in age from the pre-agricultural Tchefuncte period (estimated 900-1000 A. D.) up to the period of contact with the white man (1700 A. D.). The materials recovered are being analyzed in the laboratory in the School of Geology and reports are in the course of preparation. One report, "Crooks Site, A Marksville Period Burial Mound in La

[Turn to Page 48]

Cypress growing in lake, Chicot Park

# CHICOT PARK

## The Fisherman's Paradise In Evangeline Parish

by

N. E. Simoneaux

Chicot State Park is situated between State Highway 23 on the north and west, State Highway 224 on the east and State Highway 22 on the south. The north entrance to the park is immediately on Highway 23, ten miles from the town of Bunkie on U. S. Highway 71, and four miles from the village of Bayou Chicot. Thus the park may be reached from the west off of paved highways by traveling only four miles on graveled road and on the east by traveling ten miles on a good graveled road.

Before Chicot State Park is formally opened, the Highway Commission will be requested to pave the sixteen miles of graveled road between the village of Bayou Chicot and the town of Bunkie in order that the park may be reached by paved highway from practically any point within the state. A committee of citizens from the town of Ville Platte has secured a 300-foot right-of-way approximately five miles long for the construction of a parkway from the town of Ville Platte to the western entrance of Chicot State Park. This project would reduce the distance to the park by ten miles along highways southwest and southeast of the park through Eunice or Opelousas. The park will be easily accessible by rail also, since the Texas & Pacific Railroad runs along the eastern boundary of the park and has a station at the village of St. Landry, one mile from the north entrance of the park.

The State Parks Commission has already acquired 5,192 acres, and several additional small tracts totaling 465 acres are in process of acquisition, to be included in Chicot State Park. The largest single tract included in the park consists of more than 4,800 acres acquired from the National Bank of Kentucky in liquidation at a price of $5.00 per acre.

A Civilian Conservation Corps camp under the supervision of National Park Service was assigned to the Chicot area in September 1938. Besides service roads and bridges, the principal work undertaken in this park to date has been partial clearing of the 2000-acre lake bottom, (a great part of which contains a growth of cypress and tupelo and other species of timber), and the construction of a one-mile levee with an average height of four feet with a concrete spillway, along the northeast boundary of the park. The balance of the lake shore is surrounded by hills which have an aver-

**CCC Camp, Chicot State Park**

**Woodland scene, Chicot State Park**

age elevation of thirty-five feet above the proposed lake level. Certain sections of the lake bottom had already been cleared by previous lumber operations when the tract was owned by E. B. Norman Lumber Company. Considerable lumber, however, still remains in the lake, as evidenced by the following log and lumber record as of March 31, 1940, which represents lumber salvaged from only about 10% of the proposed lake clearing area:

**LOG RECORD**

| | | |
|---|---|---|
| Ash | 37 | logs. |
| Cypress | 2,410 | " |
| Elm | 116 | " |
| Gum (black) | 7 | " |
| Gum (red) | 81 | " |
| Gum (sweet) | 526 | " |
| Hickory | 35 | " |
| Magnolia | 2 | " |
| Oak (post) | 75 | " |
| Oak (red) | 133 | " |
| Oak (white) | 174 | " |
| Pine | 85 | " |
| Tupelo | 1,428 | " |
| TOTAL | 5,109 | " |

This Commission purchased some new and second-hand sawmill equipment for the lumber operations in this park and the labor and supervision has been furnished by National Park Service and the Civilian Conservation Corps.

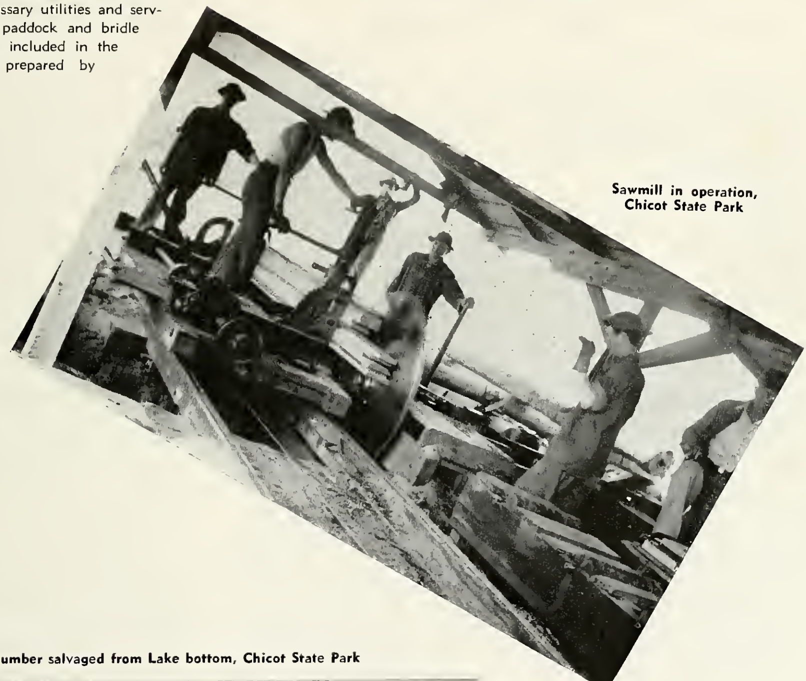
Our Landscape Architect, Mr. William W. Wells, describes the Chicot Park site as follows:

**Lake clearing, Chicot State Park**

> Its topography is surprisingly rough for a location in the central part of the state. It provides a very welcome contrast to the surrounding level territory. It also has an abundance and a great variety of plant materials which constitute the greatest single appeal of the property."

The principal facilities proposed are picnic area development, swimming, fishing and boating facilities, overnight cabins, vacation cabins, organized group camps, and a comprehensive road system with necessary utilities and service areas. A paddock and bridle trails are also included in the master plan prepared by Mr. Wells.

**Section of Lake, Chicot State Park**



**Sawmill in operation, Chicot State Park**

**Below—Lumber salvaged from Lake bottom, Chicot State Park**

It is proposed to open the public picnic grounds and, if possible, a unit of the organized group camp by the Spring of 1941.

The topography of Chicot State Park is very unusual owing to the fact that numerous fingers or miniature peninsulas jut out into the lake. This produces a shore-line of approximately forty miles, whereas the length of the lake from north to south in a straight line is about four miles and the average width from east to west is slightly over one mile.

Besides the unusual beauty of the scenery in Chicot State Park, the 2000-

### LUMBER RECORD

| Species | Total Board Ft. Cut | Total Board Ft. Used | Stock on Hand |
|---|---|---|---|
| Ash | 2,527 | 2,323 | 204 |
| Cypress | 202,146 | 50,104 | 152,042 |
| Pecky Cypress | 12,480 | 3,180 | 9,300 |
| Elm | 11,707 | 11,141 | 566 |
| Sweet Gum | 71,949 | 1,322 | 70,627 |
| Black Gum | 70 | 70 | |
| Red Gum | 9,376 | 4,755 | 4,621 |
| Magnolia | 278 | 278 | |
| Post Oak | 6,423 | 6,278 | 145 |
| Red Oak | 20,311 | 18,477 | 1,834 |
| White Oak | 26,761 | 25,691 | 1,070 |
| Pine | 1,065 | 1,065 | |
| Tupelo | 216,073 | 94,816 | 121,257 |
| TOTAL | 581,166 | 219,500 | 361,666 |

acre lake will be one of the finest fishing spots in the South. This statement is substantiated by the following report of Mr. Willis King, Associate Wildlife Technician of National Park Service, dated May 31, 1939:

"Chicot State Park, Louisiana SP-6, in Evangeline Parish, is one of the finest natural areas which the National Park Service has had opportunity to develop. This memorandum is intended to describe some of the wildlife features which distinguish this recently acquired park.

"Two major forest types characterize the area, one is the upland hardwoods, which clothe the low ridges. This forest has been selectively cut, but has largely recovered to the point where this cannot be easily detected. The climax is an oak-hickory forest, whose trees are of large size. White oak, chestnut oak, southern red oak, shell bark hickory, bitternut hickory, hop-hornbeam, and basswood are principal members of the stand. On the short slopes from the ridges to the bottom lands, American beech and evergreen magnolia are conspicuous additions to the stand. This composition gives a forest which is unusually beautiful and entirely unexpected at the southern latitude. The hardwoods have followed down the Mississippi and ascended its tributaries to form in this section of Louisiana, south of the long leaf pine belt, forests of exceptional biological interest. The most striking feature is the appearance of these hardwood trees, created by their draperies of Spanish moss. In some places the understory is dense; in others, it is fairly open with a good cover of grasses and sedges.

"Magnificent stands of cypress originally covered the swampy bottom lands. These have been cut, but in many places the loggers were unable to remove the timber. The ground was found to be so soft that equipment could not be employed in some parts of the lowlands, and there is a tangle of cypress logs which were not removed. Tupelo gum, swamp black gum and swamp red maple have made rapid growth since the cypress was cut. In some arms of the swamp there are promising stands of young cypress."

One of the features of the park will be a lake of about 2,000 acres. The length of the dam is impressive and a record in CCC projects. Nearly all the cut-over cypress lands will be flooded. Preparing the lake basin is a tremendous undertaking in itself. Many of the big cypress trees were cut as much as 12 feet above their bases, and these stumps must be recut below the expected water level. Some of the good cypress logs will be salvaged when it is possible to get them out. Some of the arms of the lake will of necessity be left as they now are, a tangle of logs, stumps and young gum trees. The stands of young cypress will be left, and the depth of water will not be adverse to them. This lake will be unexcelled as a wildlife refuge and for fishing. There are no developments planned for one entire side of the lake, and none should be undertaken there. There is an ample brood stock of minnows, and several members of the sunfish family, including largemouthed blackbass and bream, catfish, and killfishes. Excellent fishing should be obtained without any stocking or lake improvements. Food and cover now abound in the shallow water of the bayou which will be flooded only a few feet.

Ducks, herons, shorebirds, and a host of other water loving birds and mammals will find unexcelled conditions at Chicot State Park. Deer and turkeys would thrive on the uplands and if enough land is acquired to provide adequate range, they could be stocked. Otter are thought to occur, and the presence of alligators is a possibility.

Chicot State Park has a long development program ahead. It offers exceptional opportunities for aiding wildlife as well as for recreation and scientific study. These functions can be coordinated on this area without serious conflict, and none should be neglected or disregarded in planning the program. This park ranks at or near the top as an area where wildlife interest is paramount.

### FIFTH COLUMN AIDED BY FOREST FIRES

Jackson, Miss.—Secretary of Agriculture Wallace said in discussing our national defense program: "The forests of the United States are making large contributions to national defense. But the nation has not provided adequately for the defense of the forests". "Defense preparations create enormous demands for forest products", he continued. "Among them are lumber, plywood, pulp, naval stores, and plastics and the pressure in an emergency is to overcut the most accessible timber stands".

Since the forests do play such an important part in our national defense and forest fires take such a toll, it is felt that every fire allowed to burn in Mississippi might be likened to assisting the fifth column movement. Since the first of the year 4,001 fires have occurred and 2,126 of them were incendiary or deliberately set, according to A. K. Dexter, chief of forest fire control for the Mississippi Forest Service. "We realize," states Mr. Dexter, "that the majority of these incendiary fires are not set with the thought of assisting a foreign government but since wood fires cause so much damage it is apparent that we are playing into the hands of the fifth columnists. This forestry part of our national defense can be greatly strengthened by the elimination of the man-caused fire losses occurring in Mississippi each year."

### SPAWN WITH THE WIND

Despite intense scientific investigation and speculation, nothing is known of the spawning of the sailfish and his cousins, the several species of swordfish. Neither sailfish nor swordfish are ever caught in a spawning condition. Furthermore, it is a rare occasion when a sailfish under three feet long is caught. Where they spawn is still one of the greatest mysteries of the ocean. Fishing contests, held on Florida's East Coast, in which prizes are awarded for the smallest sailfish caught, have rarely produced a sail under three feet.

Where the swordfish spawns and where the young swordfish spend their time is also unknown.—From the American Wildlife Institute.

The English sparrow is not English and neither is it a sparrow. It belongs to the family of weaver birds. It ranks among the least popular of all birds and is now found everywhere.

# The Private Life of the Lake Shrimp

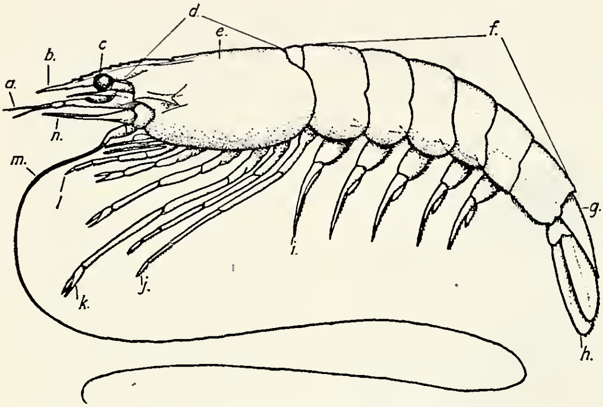
by
Percy Viosca, Jr.

Some of the most delicious animal foods consumed by the human race are the flesh of scavengers. Consider the hog, the chicken, the crawfish, the crab, and now the shrimp.

The lake shrimp is the supreme scavenger of our coastal waters, constantly moving about over the bottoms picking up bits of everything edible. They are fond of feeding amongst and upon what in fisherman's parlance is called "coffee grounds." This material is composed chiefly of vegetable detritus carried out from the marshes into estuarian lakes and bays where it is deposited in depressions by waves and currents. Amongst the "coffee grounds" is found an assortment of small animal life and some primitive living plants.

When feeding, lake shrimp crawl slowly, usually along bottoms free from rooted vegetation, bringing into use their five pairs of walking legs. The first three pairs are provided with sensitive pincers. These pincers are brought actively into play, feeling about in the mud, somewhat as one would use his hands while digging for clams. Tempting bits of animal and vegetable matter, both living and dead, are selected by the pincers from the ooze and handed over to the mouth parts.

When travelling from place to place as during migrations, which lake shrimp do frequently and with an almost uncanny instinct, they rise above the bottom and swim head foremost. They are known to swim at the surface during the night, at which time trawlers take them with a surface net. On rare occasions, one may see a school at the surface during the daytime in shallow water, the ripples formed resembling those of a school of sardines. In performing these swimming activities, an individual shrimp brings into use five pairs of oar-like swimmers situated under the "tail" or abdomen. The last four pairs of swimmers are really double paddles. The sexes of shrimp are easily distinguished by examining the first pair of swimmers, the inner members of which in the males is attached to the corresponding member on the opposite side to form an accessory sex organ.



**THE COMMON SHRIMP, Penaeus Setiferus (Linnaeus).**
**The more conspicuous structures are labeled as follows: a, antennule; b, rostrum or "spine"; c, eye; d, cephalothoras or "head"; e, carapace or "head shell"; f, abdomen or "tail"; g, telson or "tail spine"; h, uropod or "tail fin"; i, first "swimming leg"; j, fifth "walking leg"; k, "pincer"; l, third maxilliped; m, antenna or "whisker"; n, antennal scale.**

### Unique Method of Propulsion

If one should wade into a school of shrimp while bathing or seining, he becomes aware that they possess also a third or emergency method of locomotion. This is a rapid skipping backward in jerks, caused by the shrimp doubling up its body in successive snaps. This rapid method of propulsion is caused by the bringing together of two fan like structures situated on the head and tail respectively. The tail fan is composed of the last or pointed segment of the body and two double paddle-like appendages on the preceding segment. The head fan is composed of the outer modified paddle-like parts of the large antennae and the flattened bases of the small antennae.

As head and tail paddles are brought together to kick the animal backward, the body assumes a novel streamlined form which offers little resistance to the water, whereas all spine like structures, including the strong head and tail spines, are pointed in the direction of the approaching enemy. It is very obvious that this method of rapid emergency propulsion is designed by nature as an escape from enemies, of which the shrimp has many. As the shrimp skips backward through the water, it frequently rises to the surface. Here it may continue its snapping motion, the force of which is powerful enough to enable it to rise into the air in successive leaps. This surface leaping is called "jumping" by the fishermen. Shrimp may jump several inches above the water and frequently jump into a skiff.

If one's seine surrounds a school of shrimp, he may not be aware of it at first unless the water is very clear and he sees them swimming head forward in advance of the seine. The schools may even try to out-manoeuver the seiner and swim around the armpoles. Whenever a seine is closed in, however, and the shrimp realize there is no avenue of escape, they become frantic and pandemonium breaks loose. In a large school, thousands of shrimp may be in the air at one time, many of them jumping over the cork line. Frequently they start a stampede at one or more places along the cork line and hundreds of them go over in a sort of steeple chase. Experienced seiners watch for this and hold the cork line above the water whenever a stampede starts, for the schooling instincts of shrimp are so well organized that one might well lose the majority of his catch.

Anyone who has seined shrimp bare legged, will realize what the spines are for, especially when the seine is closed and a stampede starts. Although the skin of a fisherman's leg is usually tough enough to prevent puncture, the feeling of dozens of spines pricking one's leg is not at all comfortable. This experience emphasizes the benefits to the shrimp of a highly organized schooling activity. A lone fish amongst a school of shrimp is undoubtedly at a disadvantage for very likely he comes upon something akin to barbed wire entanglements.

### A Natural Camouflage

Most species of shrimps are more or less transparent, and the individuals blend into their surroundings so perfectly that they are barely discernible. Some species resemble vegetable growths with which they are associated. The so-called lake shrimp, however, seems to be an exception to this rule, and their ravenous appetites for a diversified menu take them far afield in search of food. As they travel, they pass through waters of various transparencies and over bottoms of different colors, especially those bare of living vegetation. For this reason, nature has endowed this species with remarkable powers of color change, by means of which its members can imitate both the bottom colors and the varied transparencies of the waters through which they move. In many inland bodies of water, their coloring is dull, aften reddish or brownish to mimic the muddy bottoms. In pellucid water they are practically transparent, while in muddy water they are nearly opaque. As growing shrimp migrate back to the blue water of the Gulf in which they were born, their coloration becomes more and more brilliant, and resembles the irredescent hues of their surroundings.

The chameleon-like power which enables a shrimp to change with a fair degree of rapidity, from one color to another, is due to an arrangement of groups of pigment cells in the skin under the outer shell. Most groups contain the three primary colors, red, blue, and yellow, but the proportions vary in different parts of the body. These cells expand and contract as required, each throwing off branches of its characteristic color, enabling the shrimp to assume an almost infinite variety of hues. This power of color change is most pronounced in older shrimp. It must be of prime importance to them in their constant struggle for existence against the many voracious enemies with which they are compelled to live.

### Protective Devices

Another protective device probably employed by shrimp is the exudation of a toxic secretion. After a shrimp stampede is started in a seine it will be noted that the water becomes "soapy" and slimy. This effect can also be noted in water in which shrimp have been washed. This slimy water is very irritating to abrasions in the skin. Fish caught in the pocket of a seine containing many shrimp will usually die when released. Apparently a toxic agent released by the shrimp is absorbed through the gills of the fish.

Lake shrimp also have other protective habits. When at rest they bury themselves in the mud, leaving only eyes and antennae exposed. The stalked eyes are directed outward on an angle and apparently see in all directions. The small antennae or feelers are directed forward in front of the head; but the large ones go forward, then curve gradually outward and backward, reaching well beyond the end of the tail. Lying buried in the mud, yet seeing or feeling an enemy's approach from any direction, the ability to skip away in a flash, the strong spines, the highly organized schooling instinct and the irritability and toxicity of their slime, give the shrimp more than a fighting chance against their innumerable enemies.

Fish are never taken amongst a large school of shrimp. If the water is deep enough, fish may swim above them and thus get caught in the same haul, but usually they forage around the edges of a school of shrimp, trying to isolate individuals from the main body.

The species of shrimp known to us in Louisiana as the "lake shrimp" or "creole shrimp", is known along the Atlantic coast as the southern prawn. The term "lake shrimp" probably originated in New Orleans where the species is abundant in Lake Pontchartrain, in order to distinguish it from the Mississippi River shrimp also abundant in that city. During the summer, the lake shrimp is found in all of our brackish water lakes. The name, however, is a little misleading because these are not truly lakes but estuaries. Furthermore, the term cannot be applied to adults of the species which, upon reaching maturity, seek the waters of the open Gulf.

During calm weather, lake shrimp frequently accumulate in large schools near the shore, especially in hollow places where their food is abundant. When found in such numbers the water is muddied by them as they feed. During rough and unsettled weather, these schools break up and the individuals often scatter over large areas, traveling against the wind, though no doubt in the direction of the undertow as they seek the deeper waters where the disturbance is less. When schools of shrimp are caught in currents caused by rising and falling tides, or by wind or rainfall, they travel rapidly in the same direction as these currents. This seems to be the apparent stimulus for the more rapid migrations of large bodies of shrimp.

### Changing Salinity of Water

Perhaps the real secret of their movements lies in the changing salinity of the water. At any rate, shrimp of a given size tend to remain in water of a given salinity, or at least do not desire sudden changes, and their migrations into water of a different density is comparatively slow. However, with very young shrimp there is a slow gradual migration inland or to water of lesser salinity and as they approach maturity there is a second, and usually more rapid, migration, this time back to the sea where they spend their adult life.

The breeding season is rather extended, varying with individual shrimp, most activity being during the spring and summer months. This more or less extended breeding period is sufficient to account for the great variation in size over a considerable portion of the year. There is no doubt that spawning activity in Louisiana is confined entirely to the waters of the Gulf, although there are times during the summer when ripe adults come in fairly close to the beaches and passes. After passing their larval stages in the Gulf, apparently only those young shrimp that succeed in finding their way into inside waters are destined to live. These develop their schooling instinct early and may be found in abundance along the shores of lakes, bays, bayous, and shallow lagoons near the coast where they feed in the ooze which rests upon alluvial bottoms, bare of vegetation. Here they grow rapidly and begin a slow general inward migration timed to follow the advance of salt water inland as the summer evaporation rate increases both on land and water, and transpiration by vegetation in the drainage basins is greatest. This summer migration becomes in reality a gradual spread over all waters in which biological and physical conditions are suited to their growth. The growth during the summer is at least one inch per month and as the smallest adult shrimp are six inches in length it would take not over six months for a shrimp to grow to maturity at this time.

### Seek Deeper Waters

The young shrimp which migrate inland during the summer may, before the end of September, be found far from the sea in the chains of estuarian lakes along the Louisiana coast. All this time they

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# LOUISIANA RIPLEYANA

Hey, boy, page Mr. Robert Ripley!

Believe it or not, Louisiana's forests, woods, lakes, bayous and rivers abound with oddities, some of which might even make Mr. Ripley himself blush with pride.

Good old Louisiana, known far and wide for her lovely picturesque rivers, her unlimited natural resources, famed as a land of prolific historical and natural attractions, also produces some of the gosh-darndest most grotesque-looking specimens of fish and wildlife you've ever seen.

Of course, most of these oddities are not exclusive in Louisiana. They can be found in other localities where climate and natural resources are similar to those of the Pelican State.

For example, the "Gaff-Topsail" and the "Hardhead", may be considered the Dionnes of the fish family in Louisiana. These two species of Louisiana sea catfish have extraordinary breeding habits. To use the word unusual in describing their method of propagation would be putting it very mild. Something like colossal, fantastic, or whathaveyou, probably is a better word, but we'll let it go at that. The papa fish is the head man in every respect and does the heavy work in these particular fish families. The eggs laid by the female are carried around in the mouth of the male until they hatch. Sometimes as many as fifty-five are thus cared for by a single male. The young fish, even after hatching, may for a time receive similar care from this parent. While thus engaged in guarding the eggs and young, the male goes on a hunger strike and refuses to eat. One ten and a half inch fish, when caught, was found to have had in its mouth forty offspring, which averaged one and three-fifths of an inch each in length.

The "Gaff-Topsail" is also known as the "Four Whiskered Sea Cat", and is noted for its dangerous spines. Its three stout, keen spines, when erected, can inflict deep and painful wounds.

The "Hardhead" has two aliases; it is known as "Silver Cat" or "Six-Whiskered Sea Cat". Both the "Gaff-tops" and the "Hardhead" families are voracious feeders and their bait-stealing often exasperates the sea-trout fishermen. They abound in the salt water bayous of southern Louisiana. Incidentally the best way to distinguish the two bandits is by their "whiskers". The "Hardhead" has four "whiskers" or barbels on his lower jaw instead of two as in the "Gaff-top".

The raccoon has the well known and strange habit of washing its food, which habit was won for it the technical name of **Lotor** "washer". Given clean food and a dish of dirty water, the coon has no choice but will promptly and with exactitude proceed to dunk its dinner.

The Greenland "Wheatear", a member of the thrush family, has one of the strangest migration travels of all North American birds. Nesting in Labrador, the wheatear normally moves east through Greenland, Iceland and England to France, thence south through Portugal and Spain across the Mediterranean to northern Africa where it spends the winter. Occasionally wheatears get lost and turn south too soon. One wheatear, far off its course, arrived in New Orleans instead of north Africa and established thereby the first record for its species in Louisiana. That occurred on September 12, 1888. The bird was immediately bagged and is a part of the bird collection at Tulane university. As far as is known this is the only specimen of this rare bird to be found in the state.

Did you ever see an otter play? The otter makes his own slides on slippery clay banks in snowless southern Louisiana and then swiftly and gracefully glides into the water. It's a nice game and keeps them occupied when they are not busy with other things.

There is a fur-bearing animal in Louisiana, which is known by more than a dozen different names, but it has never been definitely established that one has ever been captured alive and wild in the state. The ring-tail cat, or civet cat, or the bassarisk, are just a few of its names, but scientifically it is dubbed bassariscus astutus. The fact that the skins of this mammal have been included in many Louisiana shipments of skins, indicates that the animal exists in the state although as far as is known there has never been one taken alive and wild.

Believe it or not, there is a species of snakes in Louisiana known as "Thunder" snake, and while it is one of the most feared of all Louisiana serpents, it is completely harmless. Slate black above and coral bellied, this species is also called the horn-snake because at the end of its tail it bears a horn-colored, hard, thorn-like point. When picked up, the snake presses this point against the skin of the person holding it, giving the impression that it is trying to sting. No snake in the world ever stings with its tail—did you know that before reading this article? The thorn is used by the snake simply to anchor itself when burrowing. The thunder snake spends most of its time underground in soft wet earth.

Did you know that the Mexican eagle is really a long-legged hawk and not an eagle at all? Technically known as the Audubon caracara, the Mexican eagle occurs in Louisiana, is interesting, graceful and quite harmless.

You can add this to your collection of "Things I didn't know until now". Did you know that the Spanish moss, that gracefully adorns Louisiana's trees is, strange as it may seem, a member of the pineapple family! Contrary to popular belief Spanish moss is not a parasite in any sense since it derives no nutrition at the expense of the plant upon which it lives.

Did you know that there is a fish family in Louisiana who have relatives in far-off China? This fish, like many others, has a lot of names, but its correct name is "The Paddlefish". It is also known as Spoonbill, Duckbill Cat, Shovelfish and Spadefish. The eggs of this fish make excellent caviar, which explains why commercial fishermen have made a blitzkrieg on them, with the result that they have considerably decreased in number in recent years. The Paddlefish's only living relative inhabits the Yangtse, and Hoang Ho, and other great Chinese rivers.

There is a fish in Louisiana that looks so much like a sea weed that it has fooled many a fisherman. The Sargassum Fish or Mouse-fish, is considered one of nature's most amusing creatures, because it mimics with extraordinary accuracy the appearance of the Sargassum seaweed in the midst of which it lives. Sargassum weed, broken loose by wave action, floats at the sea surface where the Sargassum fish, clinging by means of its finger-like fins, rides safely in the drifting mass, feeding upon the wide variety of shrimp and other marine life that share the same shelter.

Although very few people know it, one of the excellent food fishes is the Dolphin, which is considered one of the most beautiful of all fishes in its brilliant color. It is believed to be the fastest fish that swims, and feeds to a large extent on flyingfish, needing its high speed to capture such agile prey. Gold and blue with deep blue spots which quickly fade at death, the Dolphin fish resembles the swift beauty of a clipper ship.

The biggest fish in the world is an inhabitant of the Gulf of Mexico. This is the Whale Shark, known to reach a weight of over twenty-six thousand pounds. Yet this is a harmless fish, if you want to take an expert's word for it, because its teeth is less than one-twelfth of an inch long. This is probably the only living fish that could have comfortably swallowed Jonah.

One of the world's strangest fish, the Great Manta, Sea Devil or Sea Bat, is a common species around the Mississippi River. Flattened and broadly square in shape, it reaches a width of eighteen feet, a length of eighteen feet, and has been said to attain a weight of ten thousand pounds. Harmless to man, it received the name of Manta or Blanket, because superstitious fishermen believed it would enfold swimmers with its vast wings and suffocate them fatally. Possessed of appalling strength, the Manta, when harpooned, is capable of towing a boat backwards while the engine is running full speed ahead. It is a common thing along the Louisiana Gulf Coast to observe these great fishes slowly swimming along the sea surface.

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# The Private Life of the Lake Shrimp

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have been growing, and as they do, they seek the deeper waters of these lakes, being replaced gradually in the shallow places by successive migrations of younger specimens. Towards the end of summer, a migration of the larger specimens back towards the sea is under way although other small shrimp are still continuing to make their way inland. As lake shrimp are greatly affected by weather conditions and changing currents, these general migrations are often obscured by many complications. In the winter months, especially, physical and biological conditions of the inside waters are much changed and the growing shrimp cannot advance as far inland as during the summer. This seems to be due in part to the cold, and partly because of the flush out of the estuaries by winter rains at a time when the evaporation and plant transpiration in the gulf drainage area is greatly diminished.

The falling tides accompanying the sudden change of the weather which usually follows the autumnal equinox, greatly hastens the seaward migration of shrimp. At this time they may leave the bottom and swim near the surface, travelling head first in the same direction as the current. Thus the shrimp crops reared during the summer in the innermost members of each chain of lakes may disappear almost overnight.

### Gap In Spawning Season

During the coldest months, lake shrimp grow very little if at all, and, because there is a gap in the spawning season during fall and winter, no new young make their appearance in inside waters. By the end of November it is difficult to find shrimp under two inches in length and a practically similar situation exists until the end of February when the smallest shrimp obtainable anywhere are about two and a half inches. These measurements not only indicate that growth practically ceases during the winter, but checks well with the discontinuance of the spawning period.

By watching the growth of these minimum sized specimens during the spring months we can arrive at another estimate of the rate of growth. This is slightly less than during the summer. By the middle of May the smallest shrimp of this so-called spring crop have grown to five inches and a new crop of young shrimp spawned in the spring has now made its appearance and the largest specimens are already two inches. From May on we have two crops to guide us, the minimum sized individuals of the old crop and the maximum sized individuals of the young crop.

By June all shrimp of the old crop have disappeared from inside waters as they assumed the adult form at a general average size of around six inches. Adult lake shrimp, now known as "sea shrimp" or "lobster shrimp" remain at sea for their entire adult life, although they may approach the shores or even enter the more open passes when tides are unusually favorable and salinity conditions correspond to those of the open sea. During early summer it is impossible to obtain any commercial size shrimp of this species in the inside waters. The new crop is as yet confined to shallow water near the coast and specimens are too small to be taken in quantities by the general methods used by the fishermen. Adult or lobster shrimp can be found in the Gulf at all seasons of the year.

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## PREDATORS NOT BAD

A later report from another province optimistically states that increases in the duck population are expected and that predators are not bad. The report confidently predicts that, because of late heavy rains, the nesting areas will hold up satisfactorily and give the fledglings ample time to reach flying age.

Paradoxically enough, too much rain has caused the loss of some young ducks in regions where the late downfall has been particularly heavy.

Favorable conditions now prevailing in the Alberta and Saskatchewan areas are expected to result in noticeable increases in mallards, pintails, shovellers, gadwalls and bluewing teal. Canvasback, readheads and several other species of ducks will remain the same, Government reports indicate.

The Delta, Manitoba, Duck Station of the American Wildlife Institute reports a small increase in the canvasback, redhead, ruddy, gadwall and shoveller, with pintails and bluewing teals about the same as last year. Mallards, widgeons, greenwing teals and lesser scaups are reported down in this section of Canada.

Observers at the Delta Duck Station also report that nesting conditions are better than last year, but that the water level is still below normal.

# Relationship Between Commercial and Sport Fishermen

### by Charles E. Jackson

A noted American sports writer, who is also a devout game fish angler, recently referred to "the commercial-minder Bureau of Fisheries". Executives of commercial fishery firms have frequently charged the Bureau with over-emphasizing the recreational features of its work, to the detriment of our more important responsibility — conservation and utilization of food fishes. I like to think that both groups are right; for therein both charges are answered—conclusive proof that the Bureau of Fisheries divides its responsibilities about equally between food and game fishes.

The Bureau of Fisheries is not commercial fish-minded, it is not gamefish minded, but it is **fish conservation-minded;** and the term **conservation** means, in our definition, **wise utilization,** whether it be for recreation or for food uses. This has been the policy of the Bureau since its founding and remains so today—three-quarters of a century later. It is more especially a binding policy now, since we have come under the aegis of a Department whose Secretary, Mr. Ickes, has declared himself irrevocably bound to carry out a program of conservation of all our national resources. It gives me particular pleasure to say that the Bureau has had not only the fullest co-operation of Mr. Ickes, personally, but that of all the Assistant Secretaries, as well as the heads of every Bureau of the Department.

*Address to be delivered at Fifth Annual North American Wildlife Conference, Tuesday, March 19, 1940.

I have analyzed our 1939 expenditures and find that the Bureau, out of its total appropriation, spent about $50,000 more for game fisheries than for the commercial fisheries. I can easily understand, however, that a cursory review of our annual report on the progagation and distrbution of fishes at the Bureau's fish cultural stations may leave a reader with an erroneous impression. For instance, we boast of an annual production of 8 billion fish and eggs. In the breakdown of varieties, however, we show 7 billion commercial species and only 1 billion game species, leaving the sportsman with the impression that we produce seven times as many commercial as game species.

#### Costs of Production

The facts are, actually that commercial species, with the exception of lobsters, are all planted in the fry stages, are not fed in our hatcheries, and in most cases are planted when only a few days old. The cost of production, therefore, is insignificant when compared with game fish which are distributed as fingerlings, in 6-, 7-, 8- and 9-inch sizes, necessitating expensive feeding, large water areas, and a long period of holding in our production units.

The cost of producing commercial fishes averages $21.00 per million, while the cost of producing game species averages $6,146.00 per million. A billion planted game fish in fresh waters of the country come nearer meeting the demand than 7 billion commercial species planted in commercial waters. About eight-tenths of our fish culture appropriation is expended for the production of game species.

Our figures are, therefore, easily misinterpreted, and merit a closer analysis by the sport fisherman in order to get the true picture. As a matter of fact, practically every variety found in the coastal and inland waters is sought at some time or place by the hook-and-line fishermen for recreation. The hatchery contribution to recreation, therefore, really consists of billions of semi-game as well as strictly game fish.

The charge of favoritism to commercial fisheries comes from the sport fishermen, an ever-increasing army of citizens whose strength in influencing public opinion far outweighs that of the commercial group. For instance, our figures for the past five years show no material increase in the total number of commercial fishermen, now numbering about 130,000. The number of anglers taking out fish licenses, however, has shown a remarkable increase during the same length of time—jumping from 4,858,059 in 1933, to 7,436,177 in 1938.

This great army of anglers does not include the salt-water game-fishermen except in California, nor does it include small boys and girls, many thousands of hook-and-line fishermen, women anglers, and many other groups who are exempted from taking out licenses in various states. It seems to me that a conservative estimate of anglers in the United States would easily reach 15 million; and, even if only 1 million of these are organized into active clubs, several hundred thousand are leaders in their communities, have strong political influence, and constitute a powerful factor in moulding public opinion.

#### Commercial Fishermen Not Organized

The commercial group, although comparatively small, can also wield considerable influence, raise lobby funds, and if necessary make an effective fight to protect what they consider their interests. At present, however, the commercial fishermen are not organized, nor have they ever been, except in small groups dealing usually with a single species of commercial fish, such as salmon and sardines.

The Bureau of Fisheries needs the benefit of the combined influence of both groups of fishermen. It is essential, if we are to have true conservation, that the facts of any given fishery be known and properly interpreted. Fishermen should not jump to conclusions. It is an easy course for the angler, when his catch decreases, to place the blame on the commercial fishermen, and with their organizations, their great numbers, their valuable contacts, entirely eliminate the commercial fishermen. In some past instances this has been done without a full knowledge of the conditions prevailing, resulting in unemployment, bitter feelings, and in some instances to the detriment of the supply of game fish.

I quote, for example, an experience in Louisiana as related in the book of Mr. Percy Viosca, on PONDFISH CULTURE:

> "Little seems to be known of the competitive relationships of game and commercial species of fish. Several years ago, a number of lakes abounding in game fish had been closed by local police power against all forms of commercial fishing, supposedly to protect the game fish from the depredations of these fishermen. There was little

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*Acting Commissioner, U. S. Bureau of Fisheries.

poaching as the anglers saw to that themselves, but there was a noticeable decline in the game fish catch each year, until soon angling was hardly worth while. Upon investigation, it was found that the shallow waters in these particular lakes were largely devoid of all but microscopic vegetation. Turtles were abundant, and the lakes were overrun with buffalo fishes, gars, carp, and carp suckers. The anglers had removed only game fish, leaving their competitors and enemies to breed and grow unmolested.

"Soon a plan was initiated whereby commercial fishing rights were leased to responsible fishermen, and the funds thus provided were used to pay special wardens and to improve both game and commercial fishing. From Lake St. John, one of these lakes, as much as 200 pounds of commercial fish per acre per year were removed without injury to the game fish, and thousands of pounds of gars were destroyed. A balance is now maintained in the waters between the game and commercial species. Thus the war between the anglers and the commercial fishermen was settled in a way immensely profitable to both.

"The above experience emphasizes the need for devoting more thought and study to the ecological relationships of game and coarse species, particularly such forms as gars, carp, suckers, and bullheads which may dominate waters otherwise admirably suited to the development of an abundant game fish fauna. Prohibiting the seining of the coarse species upsets nature's balance, which certainly cannot be restored in favor of the game fish by the planting of innumerable fry and fingerlings. A well-regulated commercial fishery, working hand in hand with the anglers and their game fish restoration program, is the only answer."

### Sport Fishery Data

Since 1871, the Bureau has been collecting annual detailed statistics on the commercial fisheries, and these accumulated data supply one of the most important working tools of the fishery biologists in determining the trend of a fishery. Some of the States, too, have developed important statistical data. Practically nothing has been done to obtain statistics of the sport fishery, and no appropriations are available to our Bureau for this purpose. Recent information compiled by several States with the aid of sport clubs and angler groups on a limited number of species has, however, given us some conception of sport fishery statistics. Many of the results are amazing, showing conclusively that some way must be found to obtain these data if fishery biologists of the present and future are to have an index on the trend of the fisheries. Often the available commercial statistics give only half the story.

Recently a report was published by the New York State Conservation Department of "A Biological Survey of the Salt Waters of Long Island, 1938". This survey was a co-operative project of New York State and the Federal Bureau of Fisheries. It was found that the commercial catch of winter flounders for that year was approximately 645,000 pounds, or about 1 million fish. During the same period the recreational catch amounted to approximately 1 million fish. This figure was compiled from information supplied from the charter-open- and rowboat fisheries, which cater to the general public through the hire of, or passage on these boats, and does not include any record of catch by anglers on private craft nor individuals who reach the beach by private transportation. The recreational catch of winter flounder, therefore, equalled the commercial catch, although only a portion of the recreational fishery statistics are available.

Tagging experiments of 1937 in Great South Bay, Long Island, on the same species, showed that of the total number of returns within a two-year period after tagging, 14 percent were recaught by the commercial fishery, and 24 percent by the sports fishery. A 1938 experiment in the same area revealed, after one year, that returns of the commercial fishery were 23 percent, and of the sport fishery 27 percent.

Thus there appears little doubt that if we had complete statistics of the catch of winter flounders by the entire recreational activity for Long Island, it would exceed the catch of the commercial fishery of 1938.

### Take of Chinook Salmon

From the State of Washington comes a report that the sportsmen are rapidly increasing their take of chinook salmon in the inside waters of Puget Sound. In 1938 the commercial fishermen took 51.2 percent of the chinooks, while the sport fishermen took 48.8 percent. In 1939 the sport fishery for chinooks increased to 58.1 percent while the commercial fishery fell off to 41.9 percent. And here again, while complete statistics are available on the commercial catch, only a portion of the sport fishery catch is available.

From the Great Lakes, Dr. John Van Oosten, a noted authority on the Lake Fisheries, writes:

"Although we have no statistics to support our statement, yet it may safely be said that in some areas the angler takes out of the Great Lakes more poundage of certain varieties of fish than does the commercial fisherman. For example, it is believed that the sportsmen take more pike, rock bass, saugers, smelt, white bass, yellow perch, and wall-eyed pike out of Lake Michigan than are taken by commercial fishermen. With the rapid development during the last two years of deep sea trolling for lake trout it was learned that in at least one important locality the anglers' catch of this species exceeded that of the entire commercial fishing fleet operating at this port."

The following summarizes a report entitled, "Our Water Resources and Their Conservation," by R. V. Truitt, Director of the Chesapeake Biological Laboratory.

Approximately 200,000 sportsmen, says Truitt, fished with hook-and-line on the Bay during 1936. Statewide records for 1937 and 1938 indicate that between 290,000 and 300,000 persons go to Maryland's marine fishing grounds annually to try their cunning and luck against game types.

Some 630 boats are employed in the operation either full-time or part-time, on a commercial basis, while hundreds of others carry private parties for which no records are available. Employment is given to more than one thousand persons on the water directly engaged as guides or boatsmen.

From these illustrations it may be seen that the sport fishermen, at least in some cases, are not justified in placing the blame for depletion entirely on the commercial fisherman.

Fresh water trout from the mountain streams, black bass and other fresh water species, are not subject to commercial use and are reserved solely for the game fishermen. This discourse does not pertain to these species, for commercial fishermen are not seeking to share this catch. Other species fall in the same category.

This paper deals with species that are now shared by both commercial and sport fisheries, where the interests of the two groups in reality are identical in so far as the conservation of the supply is concerned. If management practices are adopted that will maintain the supply at high enough level of abundance to afford profitable commercial fishing, there will be enough fish for the angler also. Only in cases where faulty management is practiced, and the supply allowed to diminsh, is there controversy between the two groups.

Proper management does not usually mean the elimination of either type of fishing, but means the adoption of regulations which will permit the supply to recover and to be maintained at a stable level. There are situations, however, in which controversy may arise between the commercial fishermen and the anglers which has no relation to the conservation of the fish themselves. Wise utilization of the supply frequently involves a decision as to the best means of utilization; that is, the use of the catch to yield the greatest benefit either in terms of economic income or the satisfaction of all other legitimate demands.

There are local cases where the protection of the supply solely for the use of anglers is the wisest course, yielding the greatest revenue and the greatest

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# "SNAKES! I HATE THEM!"

## PART I

by
James Nelson Gowanloch*

"Snokes! I hate them!" That is the average response to the appearance of almost any snake almost anywhere.

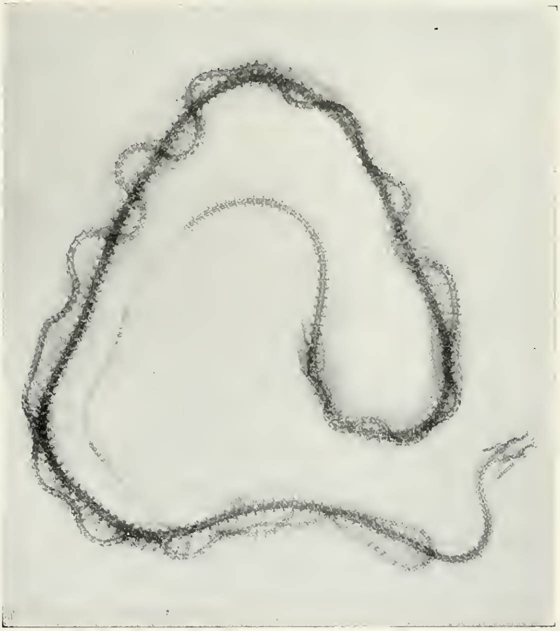
Snakes, some seventeen hundred kinds of them, are scattered practically everywhere over this our earth except in Ireland, where, as any Scotsman will tell you, only Irishmen live anyway. Even yet it is not quite clear whether the Irishmen could not stand the snakes or the snakes could not stand the Irishmen.

Louisiana has its quota of forty or more kinds of snakes, some beneficial, some neutral, some bad, some dangerous.

Snakes, more abundant in the temperate regions than are lizards, attract, because of their peculiarities, the fascinated attention of man, woman and child. Almost everyone in the United States has had some experience with these highly specialized reptiles, the reactions varying all the way from mild curiosity to violent hysteria.

It is the purpose of this article to discuss some Louisiana snake species with particular reference to those poisonous kinds whose venom may at times constitute a real danger to the hunter, the fisherman and the picnicker. Some snakes here mentioned do not exist and never did exist except in the rich imagination of man. Such are the deadly hoop snake and the dreaded puff-adder, whose contaminated breath will poison all at hand. Even fish stories must take second place to snake stories when it comes to a matter of drawing the long bow.

Snakes, by and large, are in Louisiana useful animals. Six Louisiana species are poisonous and should be destroyed at sight. Certain others destroy useful birds but may compensate for this damage by eating rodent pests and noxious insects. Water snakes of several species deserve instant death, since they subsist almost exclusively on fish, often killing large numbers of young black bass ("green trout"), "perch," "bream" and other game fish. Many other snakes, highly interesting, because of preference for darkness or fondness for concealing themselves under logs or in swampy earth, are rarely seen. Their chance discovery arouses frequently such curiosity that even snake haters bring them carefully in for examination, sure that they have at last found something quite new in this world. Many other snakes are either harmless or wholly useful.



*(Photograph from Kelly by E. A. Morrison.)*

**An X-ray from a King-snake which has swallowed another snake of the same genus longer than itself. Note the position of the skull and the extraordinary looping of the tail of the victim.**

Snakes are legless reptiles whose structural adaptation has transformed the relatively compact body of the primitive reptile into an elongated highly efficient machine that "walks" without legs. Graceful gliding motion, intricate and often brilliantly colored armor of scales, glittering lidless eyes, nervous flickering of tongue, all compose part of a picture that fascinates the student of nature.

Snakes have long family trees for as Kelly (1936) has so well said: "Somewhere bordering on a hundred million years ago, snakes began to appear on the earth. The earliest known in North America is from the Upper Cretaceous of Wyoming, described by Professor O. C. Marsh as *Comophis precedens*; in Europe a snake (*Pachyophis woodwardii*) has been found in the Lower Cretaceous (*fide* Dr. C. W. Gilmore, U. S. National Museum). Let us, then, be prepared with due respect to reflect upon the virtues and the modicum of faults of a group of so ancient and honorable a lineage—a group which, footless and without hands, has come

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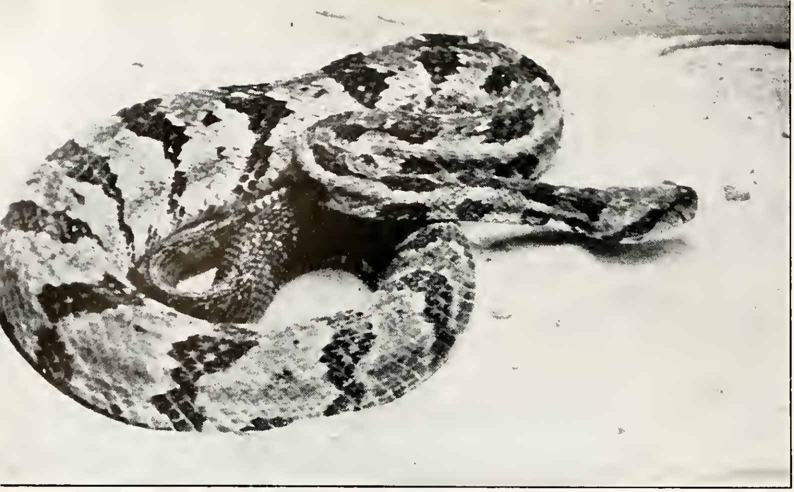
*Chief Biologist, Department of Conservation.



A Canebrake Rattlesnake from Alexandria, Louisiana. This specimen, measuring six feet two inches in length, particularly exhibited the striking beauty that the color pattern of the species may attain.

*(Photograph by James Nelson Gowanloch.)*

down to us through all the vicissitudes of the forty million years of the Eocene and Oligocene periods, followed by the Miocene, Pliocene, and Pleistocene; again, I cry, What an ancestry!"

"Slimy" is no word to be applied to snakes, even by Adam who lost through one woman and one snake his ownership of Heaven. It is a literary lapse of the worst sort, since the skins of snakes are not provided with the glands that manufacture slime typical of amphibia and fishes. Characteristically, snakes are dry-bodied animals, their skin covered with closely set scales which often are objects of great individual beauty and may or may not be provided with elevated ridges, termed "keels."

The identification of snakes is not an easy matter, since it depends not only upon such superficial features as color and shape, but also particularly upon the number and arrangement of modified scale structures which form flattened plates to which have been given such diverse names as "parietal," "labial," "ventral," "loreal" and many more. These plates, really flattened scales, are in some species so small that their structure must be examined with a magnifying glass. The nature student must therefore be provided with an authentic key and must be willing to study at close range with great care the dorsal, ventral and lateral views of his snake's head to ascertain the numbers and arrangements of these peculiar plates. Such a key of considerable use for the majority of Louisiana snakes is that given by Halton (1931). Even then, the specific identification of some snake groups, such as, for example, the water snakes, remains a matter of considerable difficulty for the zoologist, since wide variations in color patterns and scale numbers exist.

Snakes are typically land or fresh water animals. The only truly marine snakes of North America are a special and interesting group known as the Hydridae, notable for their compressed tails, adapted for swimming. True "sea serpents," though they are only two feet long, one species and only one, the Bicolored Sea Snake, *Hydrus platurus*, occurs throughout the Pacific Ocean and has been captured twice in the Gulf of California. These sea snakes are closely related to Coral-snakes, and like them are poisonous with Cobra-like poisons.

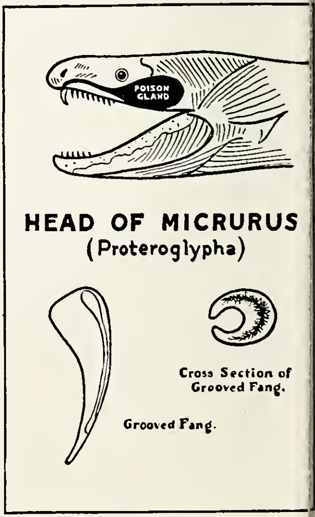
### Snakes Can Swallow Bigger Ones

Remarkable also is the ability of many snakes to swallow prey much larger than the apparent size of their own mouths. This is possible because of the serpent's ability to dislocate its jaws and thereby engulf relatively massive creatures. The grass snake engaged in swallowing a frog or toad twice its diameter has provided many a startling spectacle for inquisitive children. The reader need only refer to the accompanying illustration to realize that it is possible, as here shown by X-ray, for a snake to swallow another snake longer than itself. It was necessary for the victim here to be thrown into looped folds so that it could be accomodated within its captor. Probably some of the horror with which snakes are often regarded is derived in childhood from the spectacle the feeding snake affords as slowly and relentlessly it swallows its struggling victim. The sinister stare of the snake's eyes, its sinuous movements, and its man-interpreted "cruelty" give it a reputation that in strict biological terms it really does not deserve.

### Snake Books

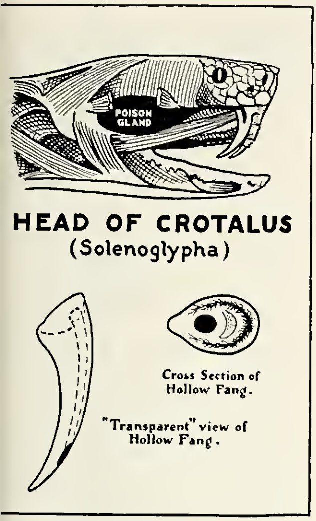
Four particularly valuable state snake publications are "Alabama Reptiles," Halton, 1931, "Snakes of Maryland," Kelly, 1936, "The Reptiles of Ohio," Conant, 1938, and "A Contribution to the Herpetology of Florida," Carr, 1940. Every student of snakes should secure these books. Every student of snakes should also consult his best available public library for such standard and invaluable works as those by Ditmars: "The Reptile Book," and "The Reptiles of the World."

It will require but a brief time for the amateur herpetologist to learn to use with accuracy the many simple keys that are available for the identification of snakes. The characters are such that, as has already been indicated, require



*(After do Amaral)*

**Diagram showing the arrangement of the poi fangs and poison glands of the Coral-snake species allied to the Cobras.**


POISON GLAND
HEAD OF CROTALUS
(Solenoglypha)
Cross Section of Hollow Fang.
"Transparent" view of Hollow Fang.

*(After do Amaral)*

**agram showing the arrangement of the poison ngs and poison glands of a Rattlesnake.**

careful examination of a specimen in hand but to the nature lover this work will have its fascination.

Snakes, it is interesting to note biologically, may in some species vary through wide ranges of color and pattern, providing a sharp contrast with the birds, their relatives, whose scales having become feathers and dyed like Joseph's coat in many colors are nevertheless quite precisely alike in those colors so that, within certain limits, color is a better mark by which to identify birds than reptiles.

The poisonous snakes of North America belong to two quite different groups. The first, the Elapine snakes are related to the Cobras and are dangerously poisonous. The startlingly beautiful Coral-snake belongs to this group. To the second group, the Crotaline snakes, belong all of our poisonous species with the single exceotion of the Harlequin Snake. Here belong all the Rattlesnakes, the Cottonmouth and the Copperhead. Crotaline Snakes possess three conspicuous characteristis: first, the head is broad and more or less lance-shaped; second, the pupil instead of being round as in other snakes, is a vertical slit, resembling the pupil of a cat's eye; third, there exists about midway between the nostril and the eye, a peculiar pit, which gives to the whole group their name of "pit vipers." The function of this pit remains still unknown. All of our Louisiana poisonous snakes, with the exception of the Coral-snake, the Cottonmouth Moccasin and the Copperhead, are marked by possessing peculiar structures termed rattles which are epidermal in origin.

All poisonous snakes, not only in Louisiana but everywhere in the world, inject their venom by means of their teeth. The method of injecting the poison differs in the elapine and crotaline groups. The elapine snakes do not strike with long fangs as do the Rattlesnakes, the Cottonmouth Moccasin and the Copperhead, but instead they "chew." Their venom, however, is extremely poisonous.

All Crotaline Snakes (with the single exception of a South American species, the Bushmaster) bear their young alive. The eggs, retained in the oviducts, undergo development there until they hatch. The Coral-snake on the other hand lays its four to seven eggs under the shelter of a log. They hatch in thirteen weeks.

### Where Snakes Belong

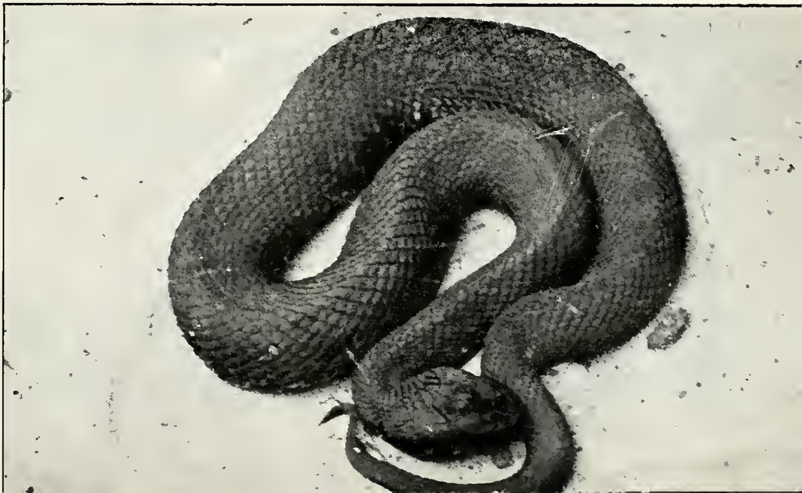
Snakes are reptiles, belonging to that group of vertebrates, the reptilia, which includes in Louisiana, lizards, snakes (serpents), turtles and alligators. Snakes differ from other reptiles (with exceptions which will be stated) in the fact that they have no legs. This does not mean, however, that never in their family tree were they walking animals, for it has been clearly shown that certain of the larger snakes, for example the Pythons, exhibit minute remains of what were once legs.

Certain lizards, for example the famous "glass snake." *Ophisaurus ventralis* (Linnaeus) Daudin, have also lost their legs and thus superficially resemble snakes. Such legless lizards differ greatly from snakes in character of scales and form of bodies. Snakes never possess either movable eyelids or an external opening to the ear (the external auditory meatus). These two points also distinguish the so-called "glass snake" from true snakes, since "glass snakes" possess both of these above named structures.

Reptiles possess so many structural features, suggestive of structural features of birds, that many scientists have treated birds and reptiles as a single group, the Sauropsida.

The tongue of snakes is a peculiar structure. Capable of astonishing protrusion, it has earned the erroneous name of "stinger". As a matter of fact no snake's tongue is capable of stinging anything, since never is it provided

*(Photograph by Dr. W. L. Tower.)*



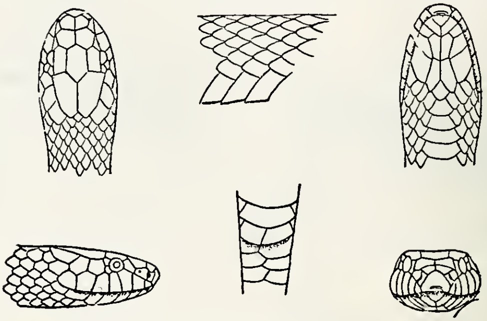
**An old and a young Cottonmouth Mocassin showing the sharply contrasted color patterns at different growth stages.**

with poison. The tongue, extraordinarily delicate, is a most sensitive organ of touch. Because of the fact that an alarmed snake displays its tongue in what is, to human beings, a menacing manner, a false impression that it is an organ of defense has widely arisen.

### Snake Legends

Every countryside can provide people who have witnessed or heard of astonishing adventures with snakes. There exists in Louisiana a perfectly harmless snake, known almost universally as the Coachwhip Snake, *Coluber flagellum flagellum* Shaw, a species addicted to tree climbing and sometimes to nest robbing. The Coachwhip may attain a length of over six feet. Harmless though it is, this snake is seriously believed by many country people to have the habit of beating people to death. The setting and character of these alleged attacks upon human beings may become highly dramatic. Thus the writer was seriously informed of the following dreadful tragedy. The cruel brothers of a young Louisiana woman decided to play a practical joke on her, to take advantage of her fear of snakes. Securing and killing a Coachwhip Snake, they placed its body, coiled in a natural position, in her bedroom, and having on some pretense arranged for her to enter the room, they locked the door from the outside, and thereafter heard their sister's excited screaming. Time passed and her screams ceased, so, concluding that their joke had gone far enough, they unlocked the door and discovered to their horror, the mate of the Coachwhip Snake had climbed a large magnolia tree whose branches swept the bedroom windows and, entering through the window, had beaten the poor girl to death. The only thing that is the matter with this fine and theatrical story is the simple fact that no Coachwhip could ever beat anyone in any way at all. This story, in variant forms, is to be found in many lands.

The Coachwhip is also interesting in that the young of this snake differ greatly in appearance from the adult. They are light brown in color with a definite mottled pattern. The writer receives very frequent specimens for identification brought in from the New Orleans area, since even students with access to usual text books may fail to relate the sharply different young with the darker adult Coachwhips.



*(After Cope)*

**The Coral-snake, Micrurus fulvius (Linnaeus). Stejneger & Barbour.**

Conant (1938) illustrates one case where several farmers killed and hung up for display 106 Racers (*Coluber sp*). He remarks: "The potential value of these snakes, in point of numbers of rats and mice they might destroy, is incalculable."

Another common Louisiana snake almost universally feared is the completely harmless, docile and beautiful species known as the Stinging Snake or Thunder Snake. *Farancia abacura* (Holbrook). This creature possesses at the end of its tail a curious horn-like point which it uses to anchor itself on the ground. When picked up the Thunder Snake characteristically presses this structure against its captor's hand, thus gaining for its harmless self a terrible reputation for deadliness. Mead (1934-35) has given interesting observations concerning the feeding habits of this snake.

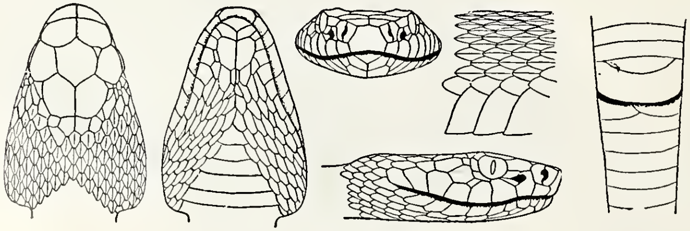
Local Louisiana legend is the tale of huge serpents reputed to inhabit deserted buildings near the Mississippi River passes. Elusive, indeed, these snakes exist in the minds of many local inhabitants who believe them to have escaped from north bound passing fruit boats. Needless to say, none has yet been either captured or even seen.

The Hoop Snake is sadly missing from the collections of every museum of the world. It is a terrible creature whose activities Kelly (1936) thus concisely describes:

"One of the most curious tales is that of the mythical hoop snake. This strange animal grasps its tail in its mouth, making a hoop of its body, and courses speedily up hill and down dale. Should it attempt to attack the observer, his safest plan is to jump behind the nearest tree which the snake strikes with its poison spine and sticks fast, when the prospective victim gathers courage to appear and dispatch the enemy; the tree at once turns black and dies shortly from the poison injected!"

That admirable gentleman, Dr. Howard A. Kelly (1936), quotes from wise Lew Johnson two fine tales of horrible attack by snakes:

"A man and his wife were traveling out on the desert in California. The wife wanted to be photographed standing by the car with a desert background, so the husband, fixing his camera and looking into the view-finder, began backing away to get a good distance. Suddenly, wildly shrieking, 'Rattlesnake!' he threw the camera into the air, staggered toward the car, and fell face down in the sand, apparently dying. Imagine the feelings of the woman whose snake knowledge, like her husband's, was elementary and fictitious.

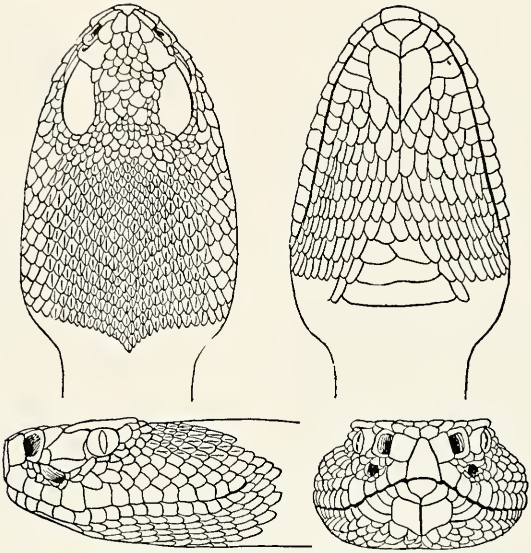


*(After Cope)*

**The Cottonmouth Mocassin. Agkistrodon piscivorus (Lacepede) Cope.**

There she was out on the desert alone, with her husband dying from a rattlesnake bite, unable to drive the car, and aware that help might not come for hours. Fortunately, a naturalist in the neighborhood, hearing her screams, hurried to see what was up. He examined the victim from head to foot but failed to find any telltale fang marks. He did discover, however, some cholla thorns embedded in the man's thigh just above the knee, and back in the bush was a wicked clump of chollas with a growth of desert peas (Crotalaria), dry and rattling like a bunch of snakes when touched. The poor fellow was bedridden for two weeks from nervous prostration and a heart attack induced by fear and shock. And all because he was afraid of snakes and knew nothing about them.

"Several years ago, a man shocking grain in southwestern Wisconsin on a hot, sultry summer day, sat down to rest, leaning against a shock. A rustling sound disturbed him and turning to see what it was, he beheld one of those terrible blowsnakes (our harmless Puff Adder — *Heterodon contortrix*), spreading its neck as wide as three fingers and blowing its poisoned breath right into his face. It took a pint of whiskey to quiet his heart, and he couldn't work again for two years!"



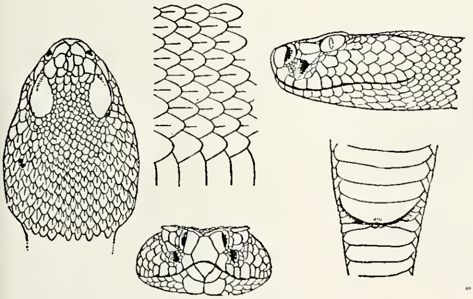
*(After Cope)*

**The Diamond-back Rattlesnake, Crotalus adamanteus Beauvois.**

### First Aid for Poisonous Snake Bite

A great deal has been written about first aid treatment in cases of snake bite but the necessary information may be quite compactly summarized. A great deal of disagreement is indicated in the desirability of the use of antivenin serums by amateur naturalists. The soundest advice appears to be that the use of such sera involving not only hypodermic injections but also refrigerated storage of materials should be left to the hands of competent physicians. Two things should be made clear: First, no alcohol, and, second, no potassium permanganate. Whiskey, traditional snake-bite antidote of the Wild West, does damage by speeding up the distribution of the poison throughout the body of the victim. Potassium permanganate has been shown to cause more damage than good since it destroys tissues into which it is injected without necessarily accomplishing the breaking down of the snake poison. The amateur field naturalist in a poisonous snake country could well carry with him, however, a couple of sterilized razor blades for use in first aid measures, together with the usual first aid tincture of iodine to sterilize the lacerations and prevent subsequent secondary infections.

Conant (1938) has given excellent directions for snake bite first aid:



*(After Cope)*

**The Canebrake Rattlesnake, Crotalus horridus Linnaeus.**

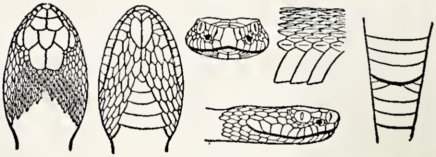
"A thorough knowledge of what to do in case of snake bite is something which everyone who spends much time in the woods or fields should acquire. Many accidents with venomous snakes occur at such times and places that the proper application of first aid meaures may mean the difference between life and death.

"Snake poison is a colorless or yellow fluid secreted by glands at the sides of the snake's head. By means of hollow fangs it is injected into the body of the victim. Venoms vary in composition but those from snakes of the same species are very much alike.

"Treatment, briefly outlined, resolves itself into three essential steps. These are:

"1. *Use of Tourniquet.* A tourniquet should be applied to the bitten limb a few inches above the bite but it should not be drawn too tightly. Recent investigation has shown that the poison travels most rapidly through the lymph system and that the tourniquet only needs to be snug enough to impede the lymph flow. Adjusting the ligature so that a finger can be forced between it and the skin will give some idea of how tightly it should be pulled. If it is too tight there is danger of seriously interfering with the flow of the larger and deeper blood vessels.

"2. *Incision.* An incision should be made connecting the fang punctures,



*(After Cope)*

**The Pigmy Rattler, Sistrurus miliarius (Linnaeus) Garman.**

and again at right angles to the first cut, with a sharp, sterile instrument. The incision should be made as deeply as the fangs have penetrated—½ inch in the case of a large copperhead . . . . and somewhat deeper for a large timber rattlesnake (Canebrake Rattlesnake). If the limb becomes greatly swollen it may be necessary to make similar incisions in the most affected areas. Care must be taken when cutting not to sever a blood vessel or to injure a bone.

"3. *Suction.* Considerable amounts of venom can be removed by applying suction at the site of the incisions. This may be accomplished either with the mouth or by means of one of the numerous types of suction devices now included as part of modern snake bite kits. Suction should be continued for 20 minutes out of every hour and in the most severe cases it may be necessary to continue it for 15 or 20 hours.

"It is essential to keep the patient as quiet as possible. Some feeling of confidence may be instilled by knowledge of the fact that the death rate without any treatment is only 15% and that with proper energetic first aid measures it can be consistently reduced to 1½%. The use of stimulants, particularly alcoholic ones, should be avoided. Such remedies as kerosene, urine, potassium permanganate and the entrails of chickens have long been proven useless and even dangerous.

"The services of a competent physician should be secured in every case of poisonous snake bite; the use of serum is perhaps best left in the physician's hands."

### Snake Venom

Snake venom is secreted in the form of a yellowish fluid composed of from fifty to seventy per cent of proteins, the chief other constituent being water. Small quantities of various salts, such as chlorides and phosphates of calcium, magnesium and ammonium occur. The venom is usually acid in reaction, but sometimes neutral. When dried, it will retain for many years its poisonous character, and need only be again dissolved and introduced into the blood stream to produce its effects. Dr. S. Weir Mitchell, the physician who so ably investigated snake venoms over seventy-five years ago, noted that some snake venoms which he retained in a dried condition for twenty-three years, still remained poisonous (Mitchell and Reighert, 1886). The physiological action of various snake venoms is complex, due to differences in the composition of the poisons secreted. Various poisonous elements are the active agents in snake venom. The two most important groups being *neurotoxins*, highly complex protein substances, which have a dangerous effect upon the nervous system and *hemorrhagins*, which possesses the peculiar power of dissolving the walls of blood vessels, particularly the smallest of all blood vessels, the capillaries.

Rattlesnakes and Copperheads characteristically produce relatively little neurotoxin. The Cottonmouth Moccasin produces more neurotoxin than either the Rattlesnakes or Copperhead, and accordingly produces a more paralyzing effect.

It was further interestingly found that the amount of poison emitted in a spontaneous bite exceeded (in some instances by as much as 61 per cent) the amount of venom secured by artificially compressing the glands of a snake held in the hand.

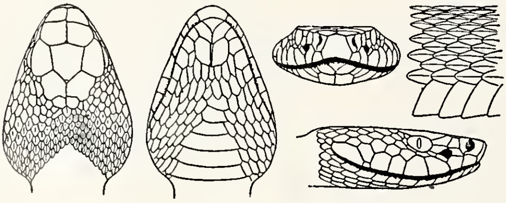
The time that intervenes between the fatal bite of a poisonous snake and death varies with different species, and also varies with the age and condition of the victim and with the circumstances of the bite. New Orleans newspapers report the death of a 48-year-old farmer, near Rayville, Louisiana, within a period of 15 minutes after being struck by what was believed to be a Rattlesnake. The attending physician expressed the opinion that the snake's fangs must have encountered a blood vessel, and, therefore, the poison was possibly injected directly into the blood stream. Cases of even more immediate death have been recorded. Blackwood states the case of a three-year-old girl, who, bitten on the forehead by a large Rattlesnake, died within ten minutes, while Roberts records the still more deadly episode of a seven-year-old boy, who, on being bitten on the cheek by a Rattlesnake, pitched forward dead before an eye witness could reach him. An analysis of fifty cases of fatal snake bite reveals that eight persons died in less than an hour, thirteen between one and six hours, eighteen in from one to twenty-four hours, four on the second day, four between three and seven days, one at the end of nine days, one at the end of seventeen days, and one over a month after the accident.

It has been a popular belief often expressed even in scientific writings that poisonous snakes are immune to their own and each other's venom. Investigations proved this to be untrue. Conant (1934) cites two instances in which Pacific Rattlesnakes, *Crotalis confluentus oreganis* (Holbrook) were fatally injured by being bitten by Cottonmouth Moccasins.

Gloyd (1933) cites another case where a Rattlesnake, *Crotalis atrox* Baird and Girard, was killed by a Moccasin.

Remarkable instances of the occurrence of what is known as protein hypersensitivity have been recorded with reference to snake venoms, as reported by Zozaya and Stadelman (1930). So extreme is this sensitivity, that in one instance, a man bitten by a Rattlesnake developed swelling and discoloration of the region of the wound, when he visited the Bronx Zoo and thus came into the presence of Rattlesnakes. A case has been reported, in which, because of his extraordinary sensitivity to snake venom, a physician could not endure having a bottle of the dried venom opened in his presence, since merely being in the same room with the exposed substance induced asthmatic attacks.

Snakes, like other reptiles, are what is popularly known as cold-blooded. This condition does not really mean that the temperature of the animal's body



*(After Cope)*

**The Copperhead, Agkistrodon mokasen Beauvois.**

completely matches the temperature of its surroundings, since under certain conditions, the internal temperature may maintain a characteristic, though low, level. Reptiles, lacking the power that mammals and birds possess of maintaining high body temperatures in the presence of even extreme cold, are accordingly much influenced by this fact in their world distribution. They are characteristically animals of tropical, sub-tropical and temperate regions. Incapable of maintaining their activities in the face of freezing weather, they naturally flourish more successfully where climatic limitations are absent. Like other "cold-blooded" animals, snakes can survive for a long time without food. Thus M. Graham Netting describes an instance in which a Canebrake Rattlesnake, one of our dangerous Louisiana species, lived over two years without partaking of a single bit of food (Netting, 1932).

[Part II will follow in Autumn issue]

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## Relationship Between Commercial and Sport Fishermen

[Continued from Page 38]

benefit. But too often the demands of anglers for the limitation or prohibition of commercial fishing are hidden behind a smoke screen of conservation. In such cases the Bureau of Fisheries cannot support restrictive measures where no conservation interests are involved, but recognizes that such matters must be decided by the individual State legislatures on the basis of economics and social justice.

Public opinion is essential if adequate progress is to be made in solving the many problems of the American fisheries, but it is vitally important that public opinion be directed for the benefit of the public at large, and not merely for a privileged class of citizens. It is for this reason that I appeal to this representative group of anglers and wildlife conservationists, that you may carry back to your local groups an understanding of this important problem—this urgent need to stop now, a growing tendency on the part of some ill-advised anglers to encourage dispute between the two groups.

### Abuses in Commercial Fishery

The Bureau recognizes that there are abuses in the commercial fishery. Along our Atlantic Coast the pound nets, the trawl nets, and other forms of commercial gear are taking too great a toll of undersized fish. The Bureau is trying to solve this economic problem by experimentation, by education, and finally with the aid of the states by regulation. In the haddock fishery, material progress has already been made in the design of saving gear, or larger meshed nets, that permit the escapement of immature fish. In this case the commercial fisherman has long erred; but he shows a desire to put into use the new gear, realizing that a small fish that demoralizes the market and constitutes a waste today, will one year hence bring him a substantial profit.

Not until the sport fishermen and the commercial fishermen understand that fish conservation is one and the same problem for both groups, will those of us charged with the responsibility of protecting the American fisheries have the full benefit of increased personnel and adequate appropriations to bring about the fullest use of a valuable natural resource that under our form of government belongs to **all** the people.

Every citizen has an equal right to the use of fish, whether it be taken in a net, or on a hook. Mrs. Kelly, who lives in the tenement district of one of our large cities with her five children, has no patience with the angler, a full-grown man who wades a trout stream all day engaging in pleasant recreation, or the surf angler who casts his line into the sea; nor is she much concerned with the commercial fisherman who may be struggling with the elements in his ice-coated fishing schooner. But she **is** vitally interested in buying inexpensive fish to feed her family, for the clinic doctor has told her that little Pat and little Maureen need protein fish food rich in vitamines to avoid rickets, to strengthen their bones, harden their teeth. And Mrs. Kelly and all the little Kellys are as much entitled to the use and enjoyment of fish as you and I, though none of them may ever experience the thrill of taking a fish from the water.

In conclusion, let me repeat, the Bureau of Fisheries is not **commercial fish minded,** it is not **game fish minded,** but it is **fish conservation minded,** and is exercising to the utmost its authority, its personnel, and its funds for the wise conservation and utilization of all fish for all Americans.

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The front half of a female Rio Grande perch, natives of South Texas, changes from a greyish color with bluish dots to a pure white during the spawning season.

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Guano, one of the richest of fertilizers, is being tested by the Texas Game Department's chief aquatic biologist, as a fertilizer for hatchery ponds.

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Deer are ruminants and chew their cud the same as a cow.

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### A Book About the Human Side of the Oil Business

By A Louisiana Author

In his latest book "Oil Is Where You Find It" (Marshall-Jones Co.,) Sam Mims has done a fine job of summing up the fundamental human traits involved in the early days of petroleum exploration and production.

The boom day of oil production, revived by the facile pen of Mr. Mims, seems almost primitive in contrast to the orderly methods of conservation regulation in use today.

"Oil Is Where You Find It" has been discovered by numerous critics throughout the nation and it is interesting to note their opinion of a book written principally about Louisiana.

The American Petroleum Institute, New York City, describes it as being "the human side of the oil game written from the point of view of the man who sees oil fields growing where crops did not, and who studies the effects of oil development both upon neighborhood and neighbors."

Excerpts from other reviews follow:

"Sam Mims' newest book gives another clear picture of a part of the south that few if any other authors have ever known—and that no one else has been able to present on the printed page." (Radio Station WNEW, New York).

"here is a highly entertaining tale about a business of which folk of this section know or hear little because you have to go to the section made famous by such figures as the pirates Jean and Pierre Lafitte, by Rebel Oakes, the former big league baseball player who got the oil craze, and others who worshipped at the shrine of Fortuna, Goddess of chance, to dig for "black gold". (Charlotte Observer).

"Independent operators, including Rebel Oakes, paid scarcely any attention to geology or to the opinion of the geologists. They paraphrased the old slogan of the gold miner into "Oil is Where You Find It". They believed that "only God knows where to find oil under the ground and he won't tell nobody." (Oakland Sunday Tribune)

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History records that the redoubtable Capt. John Smith, away back in 1608, captured a sting ray in Chesapeake Bay by stabbing it with his sword. However, the ray also used its "sword"—its sharp, barbed spine attached to its tail—with which it inflicted a wound in Captain Smith's wrist an inch and a half deep. The pain and discomfort that followed was so intense that the sturdy captain despaired of life and ordered his grave prepared. However, due to the remedial effects of a "precious ayle," the grave was not used, and Captain Smith lived to eat his antagonist and found him very good eating.

# Oil and Gas Wells Completed in South Louisiana During 2nd Quarter of 1940

| Field | Name of Company | Name of Well | Date Completed | Daily Initial Production | Size Choke (Inch) | Grav-ity | Total Depth |
|---|---|---|---|---|---|---|---|
| ABBEVILLE (Vermilion Ph.) | Continental Oil Co. | C. P. Motty Tr. 1 #1 | 3/14/40 | 208.63 | 3/16 | 52.4 | 10,269 |
| ANSE LA BUTTE (St. Martin Ph.) | Glassell & Glassell | Moresi Oil Co. #1 | 4/8/40 | 291.84 | 1/4 | 36.7 | 5,839 |
| | Glassell & Glassell | M. Breaux #A2 | 5/13/40 | 129.60 | 12/64 | 38.2 | 4,577 |
| | Glassell & Glassell | Numa Patin Est. #1 | 5/20/40 | 275.76 | 12/64 | 37.0 | 4,760 |
| | Stanolind Oil & Gas Co. | Edmund Bergeron #1 | 5/24/40 | 340.20 | 12/64 | 37.2 | 4,889 |
| | Rice Drilling Co. | Edw. Dupuis #1 | 6/16/40 | 215.28 | 10/64 | 37.2 | 4,660 |
| | Iberia Petro. Corp. | Moresi A2 | 6/27/40 | 402.96 | 1/4 | 32.0 | 2,915 |
| BANCROFT (Beauregard Ph.) | Crosby Drilling Co. | L. Dickerson et al #1 | 4/10/40 | 74.00 | 3/16 | 43.1 | 7,336 |
| | Republic Prod. Co. | Lutcher-Moore Lbr. #11 | 6/4/40 | 58.00 | 1/2 | 43.3 | 7,525 |
| | Republic Prod. Co. | Columbia L & T Co. #18 | 6/24/40 | 177.00 | 3/16 | 39.9 | 7,291 |
| BARATARIA (Jefferson Pb.) | The California Co. | Danciger State #1 | 4/13/40 | 779.04 | 1/4 | 36.5 | 8,283 |
| | Carter, Perrin & Brian | Ruttley Wiseman #1 | 4/16/40 | 714.12 | 1/4 | 36.5 | 9,817 |
| BATEMAN LAKE (St. Mary Pb.) | The Texas Company | Wax Baycu Co. #3 | 4/30/40 | 210.60 | 9/64 | 35.7 | 11,111 |
| BAYOU CHOCTAW (West Baton Rouge Pb.) | Standard Oil Co. of La. | Morley Cypress #2 | 6/22/40 | 138.36 | 8/64 | 38.3 | 8,810 |
| BAYOU DES ALLEMANDS (Lafourche Pb.) | Amerada Petroleum Co. | Gheens #4 | 6/19/40 | 100.00 | 1/8 | 35.4 | 7,569 |
| BAYOU DES GLAISES (Iberville Pb.) | Humble Oil & Rfg. Co. | A. Wilbert's B2 | 4/23/40 | 450.00 | 12/64 | 37.7 | 8,731 |
| BELLE CHASSE (Plaquemines Pb.) | The California Co. | Delta Min. Lse. 7 #1 | 4/24/40 | 250.00 | 3/16 | 35.5 | 10,251 |
| CAILLOU ISLAND (Terrebonne Pb.) | The Texas Company | State-Caillou Isl. #68 | 6/10/40 | 194.16 | 3/16 | 35.5 | 5,208 |
| CHALKLEY (Cameron Ph.) | Shell Oil Co., Inc. | Sweet Lake L & O Co. #1 | 4/17/40 | 279.60 | 7/32 | 35.9 | 8,956 |
| | Humble Oil & Rfg. Co. | K. B. Hanszen #7 | 4/19/40 | 357.00 | 3/16 | 36.9 | 8,650 |
| | Shell Oil Co., Inc. | K. B. Hanszen #7 | 5/17/40 | 121.44 | 16/64 | 38.3 | 8,943 |
| | Shell Oil Co., Inc. | Coastal Club Inc. #1 | 6/6/40 | 113.52 | 10/64 | 43.1 | 10,184 |
| CAMERON MEADOWS (Cameron Ph.) | Magnolia Petroleum Co. | Cameron Meadows #27 | 4/4/40 | 453.60 | 1/4 | 42.00 | 5,755 |
| CHARENTON (St. Mary Ph.) | Pan American Prod. Co. | A. Veeder Co. #23 | 4/1/40 | 32.40 | Gas Lift | 18.7 | 960 |
| | Pan American Prod. Co. | Veeder #22 | 4/9/40 | 182.16 | Gas Lift | 19.5 | 1,155 |
| | Hamill-Smith & DeArman | Landry #12 | 4/12/40 | 113.40 | Open | 19.8 | 1,156 |
| | Pan American Prod. Co. | H. Ecuer B7 | 4/15/40 | 91.08 | Open | 19.6 | 1,265 |
| | Pan American Prod. Co. | A. Veeder Co. #24 | 4/19/40 | 217.00 | Gas Lift | 19.5 | 1,160 |
| | H. J. DeArman et al | Simoneaux #9 | 4/22/40 | 16.20 | Open | 18.7 | 867 |
| | Hamill-Smith & DeArman | Boudreaux #10 | 4/27/40 | 16.20 | Open | 18.7 | 913 |
| | Pan American Prod. Co. | Ecuer B5 | 4/28/40 | 157.32 | Gas Lift | 19.7 | 1,160 |
| | Pan American Prod. Co. | A. Veeder Co. #25 | 5/2/40 | 24.84 | Gas Lift | 19.6 | 1,133 |
| | Hamill-Smith & DeArman | Alleman #10 | 5/4/40 | 97.20 | Open | 18.9 | 913 |
| | St. Mary Oil Co., Inc. | Hertel "B" Tr. 2 #4 | 5/27/40 | 414.00 | Open | 19.5 | 1,159 |
| | St. Mary Oil Co., Inc. | LeBlanc Tr. 6 #2 | 6/5/40 | 397.44 | Open | 19.8 | 1,135 |
| | Pan American Prod. Co. | H. Ecuer et al B8 | 6/10/40 | 132.48 | Gas Lift | 19.5 | 1,132 |
| | St. Mary Oil Co., Inc. | LeBlanc Tr. 5 #2 | 6/20/40 | 82.86 | Pumping | 20.0 | 1,126 |
| | Pan American Prod. Co. | H. Ecuer et al #9 | 6/23/40 | 99.36 | Gas Lift | 20.0 | 1,129 |
| CHENEYVILLE (Rapides Ph.) | Amerada Petroleum Co. | Weil Co. #8 | 4/9/40 | 373.00 | 3/16 | 36.7 | 5,800 |
| | Sid W. Richardson | Weil Co. Inc. #11 | 4/14/40 | 357.00 | 3/16 | 37.0 | 5,795 |
| | Sid W. Richardson | Weil Co. Inc. #12 | 5/3/40 | 390.00 | 3/16 | 37.0 | 5,797 |
| | Amerada Petroleum Corp. | Weil Co. Inc. #9 | 5/16/40 | 308.00 | 3/16 | 41.0 | 5,755 |
| | Amerada Petroleum Corp. | Weil Co. Inc. #10 | 6/14/40 | 212.00 | 3/16 | 37.5 | 5,755 |
| DARROW (Ascension Ph.) | Humble Oil & Rfg. Co. | Humble Comm. #29 | 6/16/40 | 519.36 | 16/64 | 30.6 | 4,758 |
| ENGLISH BAYOU (Calcasieu Ph.) | Union Sulphur Co. | Kaufman #9 | 6/2/40 | 321.00 | 13/64 | 40.9 | 7,615 |
| | Fohs Oil Company | M. P. Erwin #2 | 6/23/40 | 308.16 | 1" | 42.3 | 7,236 |
| EOLA (Avoyelles Pb.) | Magnolia Petro. Co. | O. Q. Foster #1 | 4/9/40 | 571.32 | 1/4 | 45.0 | 8,568 |
| | Amerada Petro. Corp. | C. A. Knoll et al #1 | 4/10/40 | 687.24 | 1/4 | 45.0 | 8,570 |
| | Amerada Petro. Corp. | Sam Cerami #2 | 4/11/40 | 665.40 | 1/4 | 45.0 | 8,570 |
| | Gulf Refining Co | M. F. Mouliere #2 | 4/11/40 | 649.00 | 1/4 | 44.4 | 8,570 |
| | Sid W. Richardson | Haas Inv. Co. #11 | 4/13/40 | 740.40 | 1/4 | 44.5 | 8,590 |
| | Amerada Petro. Corp. | Sam Cerami #3 | 4/15/40 | 681.72 | 1/4 | 44.6 | 8,570 |
| | G. R. Kennedy | Hudson Est. #1 | 4/15/40 | 470.64 | 1/4 | 44.5 | 8,578 |
| | Lake & Bass | Ritchie Wb. Co. #1 | 4/25/40 | 665.40 | 1/4 | 44.0 | 8,580 |
| | Amerada Petro. Corp. | Sam Cerami #1 | 5/5/40 | 746.64 | 1/4 | 44.0 | 8,570 |
| | Amerada Petro. Corp. | Robt. Tubre Est. #1 | 5/7/40 | 674.88 | 1/4 | 45.0 | 8,570 |
| | Sid W. Richardson | Haas Inv. Co. #12 | 5/23/40 | 687.72 | 1/4 | 44.5 | 8,575 |
| | Gulf Refining Co. | M. F. Mouliere #3 | 5/24/40 | 714.00 | 1/4 | 43.3 | 8,555 |
| | Amerada Petro. Corp. | Sam Cerami #4 | 5/27/40 | 600.48 | 1/4 | 44.5 | 8,573 |
| | Amerada Petro. Corp. | E. Tubre #1 | 5/31/40 | 678.96 | 1/4 | 44.5 | 8,570 |
| | Lake & Bass | Ritchie Gro. Co. 32 | 6/4/40 | 537.00 | 1/4 | 44.4 | 8,580 |
| | Amerado Petro. Corp. | Dent-Martin et al #1 | 6/10/40 | 231.84 | 1/4 | 44.0 | 8,573 |
| | Amerado Petro. Corp. | Glaze #9 | 6/13/40 | 308.40 | 3/16 | 34.0 | 6,485 |
| | Amerado Petro. Corp. | Dent-Howell Unit #1 | 6/24/40 | 513.36 | 1/4 | 44.0 | 8,567 |
| | Amerado Petro. Corp. | Herbert Beverly #1 | 6/24/40 | 662.40 | 1/4 | 44.0 | 8,570 |
| | Sid W. Richardson | Haas Inv. Co. #13 | 6/26/40 | 529.00 | 1/4 | 44.0 | 8,575 |
| | Gulf. Rfg. Co. | M. F. Mouliere #4 | 6/30/40 | 357.06 | 3/16 | 43.4 | 8,570 |
| ERATH (Vermilion Pb.) | The Texas Company | Verm. Ph. Sch. Brd. #1 | 4/3/40 | 67.12 | 12/64 | 44.4 | 11,762 |
| FAUSSE POINTE (Iberia Ph.) | Sun Oil Company | Kling & Wallet #1 | 5/10/40 | 74.52 | 5/32 | 23.5 | 1,214 |
| | Sun Oil Company | Kling & Wallet #2 | 6/20/40 | 66.24 | 1/4 | 23.5 | 1,204 |
| GARDEN ISLAND BAY (Plaquemines Ph.) | The Texas Company | State-GIB #43 | 4/13/40 | 567.24 | 3/16 | 39.2 | 5,275 |
| | The Texas Company | State-GIB #44 | 5/8/40 | 433.84 | 3/16 | 39.6 | 5,297 |
| | The Texas Company | State-GIB #45 | 6/17/40 | 378.32 | 3/16 | 36.5 | 6,196 |

# Oil and Gas Wells Completed in South Louisiana During 2nd Quarter of 1940

| Field | Name of Company | Name of Well | Date Completed | Daily Initial Production | Size Choke (Inch) | Gravity | Total Depth |
|---|---|---|---|---|---|---|---|
| GIBSON (Terrebonne Ph.) | Shell Oil Co, Inc. | Pelican #8 | 5/19/40 | 901.00 | 1/4 | 37.1 | 11,440 |
| GOLDEN MEADOW (Lafourche Ph.) | Frank W. Bennett | Leo Lafont #2 | 4/1/40 | 130.00 | 10/64 | 26.0 | 2,671 |
| | The Texas Company | Falgout Hdlg. Co. #12 | 4/3/40 | 324.00 | 12/64 | 36.0 | 5,175 |
| | Berkshire Oil Company | Malgom #4 | 4/9/40 | 45.00 | 8/64 | 26.0 | 2,679 |
| | Frank W. Bennett | N. Cochenic #1 | 4/11/40 | 120.00 | 10/64 | 26.0 | 2,665 |
| | Frank W. Bennett | Leo Lafont #3 | 4/11/40 | 165.00 | 11/64 | 36.0 | 5,320 |
| | Mar-Tex Oil Corp. | Rebstock D1 | 4/13/40 | 180.00 | 12/64 | 36.0 | 5,187 |
| | George L. O'Dwyer | Lafourche Rlty. Co. #1 | 4/13/40 | 324.00 | 10/64 | 36.0 | 5,490 |
| | Frank W. Bennett | P. C. Authement #3 | 4/17/40 | 36.00 | 8/64 | 60.0 Dist. | 8,625 |
| | Frank W. Bennett | Leo Lafont #5 | 4/17/40 | 108.00 | 10/64 | 26.0 | 2,682 |
| | Frank W. Bennett | Abel Bruce #1 | 4/24/40 | 114.00 | 10/64 | 26.0 | 2,675 |
| | Berksrire Oil Company | Rebstock-Esponge #1 | 4/24/40 | 89.00 | Gas Lift | 26.0 | 2,671 |
| | Marr & Vaughn | Adam Terrebonne #5 | 4/26/40 | 186.00 | 12/64 | 36.0 | 5,506 |
| | Brown-Woods & Co., Inc. | State-Bayou #1 | 4/28/40 | 55.00 | 16/64 | 26.0 | 2,696 |
| | Marr & Bristol | Alario Unit #2 | 4/28/40 | 108.00 | Open | 26.0 | 2,669 |
| | The Texas Company | State-Catfish Lk. #7 | 4/28/40 | 141.00 | 12/64 | 26.0 | 2,692 |
| | Frank W. Bennett | Leo Lafont #4 | 5/1/40 | 236.00 | 12/64 | 36.0 | 5,196 |
| | George L. O'Dwyer | Lafourche Rlty. Co. #2 | 5/1/40 | 444.00 | 12/64 | 36.0 | 5,176 |
| | Temple Hargrave | Gaspard-Rizan Comm. #4 | 5/1/40 | 195.00 | 10/64 | 36.0 | 5,509 |
| | The Texas Company | LLE-Golden Meadow #11 | 5/2/40 | 212.00 | 12/64 | 36.0 | 5,180 |
| | Mar-Tex Oil Corp. | Falgout Hdlg. Co. #3 | 5/3/40 | 200.00 | 12/64 | 36.0 | 5,180 |
| | Marr & Bristol | Alario Unit #1 | 5/11/40 | 50.00 | Open | 26.0 | 2,666 |
| | Mar-Tex Oil Corp. | Rebstock C2 | 5/12/40 | 168.00 | 10/64 | 26.0 | 2,670 |
| | The Texas Company | LaTerre #7 | 5/18/40 | 122.00 | 10/64 | 26.5 | 2,674 |
| | Frank W. Bennett | Jno. Guilbeau #1 | 5/19/40 | 216.00 | 12/64 | 36.0 | 5,088 |
| | Mar-Tex Oil Corp. | Rebstock B3 | 5/22/40 | 109.00 | 10/64 | 26.0 | 2,674 |
| | Mar-Tex Oil Corp. | Falgout Hdlg. Co. #5 | 5/23/40 | 192.00 | 12/64 | 36.0 | 5,450 |
| | Temple Hargrave | Gaspard-Rizan #5 | 5/24/40 | 196.00 | 12/64 | 36.0 | 5,541 |
| | Marr & Bristol | Church Property #1 | 5/27/40 | 67.00 | Open | 26.0 | 2,666 |
| | Jim McMurray Prod. Co. | Adam Orgeron #1 | 5/30/40 | 324.00 | 11/64 | 36.0 | 5,492 |
| | George L. O'Dwyer | Lafourche Rlty. Co. #3 | 5/30/40 | 360.00 | 12/64 | 36.0 | 5,500 |
| | Mar-Tex Oil Corp. | Rebstock A3 | 6/1/40 | 91.00 | Gas Lift | 26.0 | 2,667 |
| | The Texas Company | LaTerre #6 | 6/4/40 | 362.00 | 10/64 | 38.1 | 10,680 |
| | The Texas Company | Falgout #13 | 6/5/40 | 158.00 | 10/64 | 36.0 | 5,185 |
| | Frank W. Bennett | Guilbeau #2 | 6/6/40 | 105.00 | 10/64 | 26.0 | 2,670 |
| | Mar-Tex Oil Corp. | Falgout Hdlg. Co. #4 | 6/11/40 | 240.00 | 12/64 | 36.0 | 5,176 |
| | Berkshire Oil Company | Joe Nicol et al #1 | 6/17/40 | 390.00 | 12/64 | 37.2 | 10,078 |
| | Temple Hargrave | Gaspard-Rizan #6 | 6/23/40 | 307.00 | 16/64 | 36.0 | 5,505 |
| | Brown & Woods Oil Corp. | Gus Guilbeau #4 | 6/26/40 | 38.00 | Open | 26.0 | 2,673 |
| GRAND BAY (Plaquemines Ph.) | Gulf Refining Co. | La. State "QQ" #4 | 4/7/40 | 648.00 | 12/64 | 35.4 | 8,770 |
| | The Texas Company | State-Lookout Pass #1 | 4/23/40 | 447.00 | 3/16 | 36.4 | 10,252 |
| | Gulf Refining Co. | La. State (GB) "QQ" #6 | 5/13/40 | 421.92 | 3/16 | 35.7 | 8,130 |
| | The Texas Company | State-Lookout Pass #3 | 6/1/40 | 368.00 | 12/64 | 34.0 | 10,068 |
| | Gulf Refining Co. | La. State "QQ" #7 | 6/14/40 | 130.00 | 9/64 | 35.9 | 8,768 |
| GRAND LAKE (Cameron Ph.) | Superior Oil Co. | Grand Lake-State #9 | 4/5/40 | 299.64 | 11/64 | 33.0 | 8,986 |
| | Amerada Petro. Corp. | Mallard Bay #4 | 4/9/40 | 364.50 | 1/4 | 34.0 | 9,000 |
| | Superior Oil Co. | Grand Lake-State #11 | 4/28/40 | 345.04 | 10/64 | 32.9 | 8,990 |
| | Amerada Petro. Corp | Mallard Bay #8 | 5/6/40 | 438.22 | 3/16 | 32.5 | 9,000 |
| | Superior Oil Co. | Grand Lake-State #12 | 5/14/40 | 356.40 | 10/64 | 32.8 | 8,990 |
| | Amerada Petro. Corp. | Mallard Bay #10 | 5/23/40 | 389.52 | 5/32 | 33.4 | 9,000 |
| | Superior Oil Co. | Grand Lake-State #10 | 6/3/40 | 355.76 | 10/64 | 32.5 | 9,003 |
| | Amerada Petro. Corp. | Mallard Bay-State #11 | 6/15/40 | 324.96 | 5/32 | 31.9 | 9,000 |
| | Superior Oil Co. | Grand Lake-State #13 | 6/19/40 | 300.36 | 10/64 | 32.6 | 8,990 |
| IBERIA (Iberia Ph.) | William Helis | Bullock #A1 | 4/1/40 | 753.48 | 1/4 | 32.0 | 6,066 |
| | The Texas Company | Polk Hebert #2 | 4/26/40 | 44.16 | 1/8 | 28.7 | 8,541 |
| | Wm. G. Helis, Jr. | Bolivar "H" #1 | 5/14/40 | 114.72 | 3/16 | 20.0 | 1,026 |
| | The Texas Company | J. P. Duhe #17 | 5/17/40 | 275.40 | 10/64 | 31.5 | 6,066 |
| | The Texas Company | J. P. Duhe #16 | 6/29/40 | 307.80 | 12/64 | 33.5 | 7,009 |
| JEANERETTE (St. Mary Ph.) | Herton Oil Company | R. C. Banta #10 | 6/10/40 | 384.00 | 3/16 | 32.4 | 10,480 |
| JEFFERSON ISLAND (Iberia Ph.) | The Texas Company | Jeff. Isl. Salt Mng. #5 | 6/11/40 | 312.64 | 10/64 | 35.5 | 7,890 |
| JENNINGS (Acadia Ph.) | Gulf Refining Co. | Arnaudet #42 | 4/15/40 | 778.56 | 3/16 | 30.8 | 8,011 |
| | Shell Oil Co., Inc. | Conover Comm. #10 | 4/15/40 | 340.20 | 12/64 | 38.6 | 7,773 |
| | Stanolind Oil & Gas Co. | Crowley O & M Co. #117 | 4/24/40 | 205.20 | 3/16 | 32.0 | 7,670 |
| | Glassell & Glassell | Robt. McFarlain #8 | 5/5/40 | 329.64 | 12/64 | 38.7 | 7,429 |
| | Port City Oil Co., Inc. | Jennings-Heywood #26 | 5/20/40 | 124.00 | Open | 22.0 | 1,755 |
| | Cherokee Oil Co., Inc. | Jennings-Heywood #1 | 6/29/40 | 61.60 | Pumping | 22.0 | 1,850 |
| LAFITTE (Jefferson Ph.) | The Texas Company | Rigoletts #13 | 4/19/40 | 673.00 | 1/4 | 35.4 | 10,176 |
| | The Texas Company | LLE-Lafitte #15 | 4/23/40 | 212.00 | 3/16 | 28.1 | 10,135 |
| | The Texas Company | Madison Rlty. Co. A6 | 5/7/40 | 875.00 | 1/4 | 37.4 | 10,180 |
| | The Texas Company | LLE-Lafitte #16 | 5/29/40 | 722.16 | 1/4 | 38.4 | 10,155 |
| LAKE ARTHUR (Jeff. Davis Ph.) | Continental Oil Co. | J. Sturdivant #4 | 5/18/40 | 160.56 | 3/16 | 51.3 | 9,979 |
| | Continental Oil Co. | Albert Bel Fay #2 | 6/23/40 | 230.00 | 3/16 | 53.4 | 9,957 |
| LA PLACE (St. John Baptist Ph.) | Pan American Prod. Co. | Godchaux Sugars #1 | 4/17/40 | 54.00 | Open | 56.2 | 9,043 |
| LEEVILLE (Lafourche Ph.) | The Texas Company | LLE-Leeville #73 | 6/20/40 | 340.56 | 1/8 | 32.0 | 8,531 |
| NEALE (Beauregard Ph.) | Atlantic Refining Co. | Ira Spiers #1 | 6/7/40 | 243.00 | 11/64 | 38.1 | 8,440 |
| NORTH CROWLEY (Acadia Ph.) | Humble Oil & Rfg. Co. | Anton Ohlenforst #8 | 4/18/40 | 795.27 | 1/4 | 35.5 | 8,810 |
| | Humble Oil & Rfg. Co. | Anton Ohlenforst #7 | 5/17/40 | 714.12 | 1/4 | 35.3 | 8,800 |
| | Humble Oil & Rfg. Co. | J. B. Stokes #5 | 6/1/40 | 211.00 | 9/64 | 35.2 | 8,955 |
| PARADIS (St. Charles Ph.) | The Texas Company | LLE-Paradis #4 | 5/22/40 | 973.00 | 1/4 | 37.4 | 10,680 |
| PLUMB BOB (St. Martin Ph.) | The Texas Company | St. Martin Land Co. #13 | 5/22/40 | 325.32 | 12/64 | 37.2 | 8,536 |

# Oil and Gas Wells Completed in South Louisiana During 2nd Quarter of 1940

| Field | Name of Company | Name of Well | Date Completed | Daily Initial Production | Size Choke (Inch) | Gravity | Total Depth |
|---|---|---|---|---|---|---|---|
| PORT BARRE<br>(St. Landry Ph.) | Pan American Prod. Co. | Garland #6 | 5/21/40 | 670.68 | 1/4 | 37.2 | 6,086 |
| | The Texas Company | Botany Bay Lbr. Fee #28 | 5/29/40 | 666.36 | 1/4 | 37.4 | 6,135 |
| POTASH<br>(Plaquemines Ph.) | Humble Oil & Rfg. Co. | Orls. Levee Brd. #43 | 5/16/40 | 260.00 | 16/64 | 28.3 | 8,085 |
| | Humble Oil & Rfg. Co. | Orls. Levee Brd. #44 | 6/23/40 | 519.00 | 16/64 | 25.3 | 4,286 |
| QUARANTINE BAY<br>(Plaquemines Ph.) | Gulf Refining Co. | State "QQ" #16 | 4/15/40 | 470.00 | 12/64 | 35.4 | 8,550 |
| | Gulf Refining Co. | Orls. Levee Dist. A6 | 6/1/40 | 227.00 | 5/32 | 32.4 | 9,700 |
| | Gulf Refining Co. | La. State "QQ" #17 | 6/11/40 | 414.00 | 3/16 | 36.7 | 9,687 |
| RACELAND<br>(Lafourche Ph.) | Amerada Petro. Corp. | South Coast Corp. #5 | 4/23/40 | 832.80 | 1/4 | 36.1 | 10,210 |
| SOUTH JENNINGS<br>(Jeff. Davis Ph.) | Stanolind Oil & Gas Co. | Morgan #1 | 4/14/40 | 63.02 | 5/32 | 47.0 | 9,575 |
| SULPHURMINES<br>(Calcasieu Ph.) | Union Sulphur Co. | Fee #867 | 4/17/40 | 336.96 | 3/16 | 33.1 | 6,335 |
| | Union Sulphur Co. | Fee #868 | 5/29/40 | 296.88 | 3/16 | 30.9 | 6,239 |
| | Union Sulphur Co. | Fee #869 | 6/29/40 | 329.04 | 12/64 | 26.1 | 5,690 |
| SWEET LAKE<br>(Cameron Ph.) | Pure Oil Company | Yount Lee Oil Co. #16 | 5/3/40 | 517.50 | 1/4 | 27.4 | 7,482 |
| | Pure Oil Company | Yount Lee Oil Co. #17 | 6/8/40 | 330.00 | 1/4 | 28.5 | 7,769 |
| UNIVERSITY<br>(East Baton Rouge Ph.) | Sugarfield Oil Co. | McDonald #3 | 4/2/40 | 233.00 | 9/64 | 34.7 | 6,809 |
| | William Helis | Duplantier C3 | 4/6/40 | 243.00 | 10/64 | 36.0 | 6,497 |
| | Guaranty Oil Corp | D. J. Morgan #2 | 4/16/40 | 105.00 | 1/8 | 36.0 | 6,537 |
| | William Helis et al. | Duplantier B5 | 4/28/40 | 299.70 | 10/64 | 36.0 | 6,502 |
| | William Helis | Duplantier A2 | 5/1/40 | 235.00 | 20/64 | 36.1 | 6,492 |
| | Sugar Field Oil Company | Richard Comm. #3 | 5/16/40 | 216.00 | 10/64 | 34.7 | 6,814 |
| | William Helis et al. | LSU A6 | 5/24/40 | 214.50 | 10/64 | 36.1 | 6,493 |
| | Sugar Field Oil Company | Reinken #2 | 5/31/40 | 260.16 | 10/64 | 34.8 | 6,805 |
| | Sugar Field Oil Company | Rosebush #1 | 6/22/40 | 237.22 | 10/64 | 34.6 | 6,813 |
| VALENTINE<br>(Lafourche Ph.) | William Helis et al. | Valentine #6 | 4/2/40 | 204.00 | 16/64 | 37.8 | 7,409 |
| VENICE<br>(Plaquemines Ph.) | Tide Water Associated | Buras Levee Dist. #7 | 4/24/40 | 230.00 | 1/8 | 38.2 | 10,765 |
| | Tide Water Associated | Claude L. Johnson #1 | 5/27/40 | 180.00 | 1/8 | 30.8 | 8,305 |
| VILLE PLATTE<br>(Evangeline Ph.) | Amerada Petro. Corp. | L. O. Roberie #1 | 4/7/40 | 632.88 | 1/4 | 39.9 | 10,190 |
| | Continental Oil Co. | Martha Haas #6 | 4/21/40 | 127.00 | 1/4 | 66.0 | Dist. 9,103 |
| | Danciger Oil & Rfg. Co. | J. E. Vidrine #2 | 4/21/40 | 664.68 | 1/4 | 44.2 | 10,189 |
| | Continental Oil Co. | La. Central #3 | 4/22/40 | 231.00 | 1/4 | 61.0 | 9,081 |
| | Continental Oil Co. | Opel-St. Landry #7 | 4/22/40 | 108.00 | 1/4 | 61.6 | Dist. 9,087 |
| | Continental Oil Co. | A. Coreil #3 | 4/23/40 | 360.00 | 1/4 | 41.2 | 10,254 |
| | Continental Oil Co. | Adam Tate Tr. 9 #1 | 4/26/40 | 72.00 | 3/16 | 62.2 | 10,089 |
| | Continental Oil Co. | J. E. Vidrine Tr. 14 #1 | 4/28/40 | 499.20 | 1/4 | 46.8 | 10,236 |
| | Continental Oil Co. | Deville #6 | 5/3/40 | 127.00 | 3/16 | 59.0 | 9,005 |
| | Continental Oil Co. | J. E. Vidrine Tr. 2 #2 | 5/3/40 | 432.00 | 1/4 | 37.6 | 9,108 |
| | J. K. Hughes Oil Co. | J. E. Ortego #2 | 5/14/40 | 599.40 | 1/4 | 43.0 | 10,229 |
| | Continental Oil Co. | J. E. Vidrine Tr. 26 #1 | 5/27/40 | 168.00 | 1/4 | 59.8 | 9,113 |
| | Amerada Petro. Corp. | Foret #1 | 6/5/40 | 649.20 | 1/4 | 39.9 | 10,170 |
| | Continental Oil Co. | A.M. Fontenot Tr. 2&3 #7 | 6/8/40 | 600.00 | 1/4 | 40.2 | 9,030 |
| | Continental Oil Co. | Mrs. N. H. Hirsch #5 | 6/11/40 | 96.00 | 1/8 | 41.2 | 10,229 |
| | Continental Oil Co. | Bertha Fontenot Tr. 1 #3 | 6/15/40 | 96.00 | 3/16 | 64.2 | 10,150 |
| | Continental Oil Co. | W. L. Tate #4 | 6/17/40 | 428.00 | 1/4 | 53.0 | 10,308 |
| | Continental Oil Co. | Hattie Haas #5 | 6/20/40 | 524.40 | 1/4 | 38.6 | 10,299 |
| | Danciger Oil & Rfg. Inc. | J. E. Vidrine #3 | 6/20/40 | 567.00 | 1/4 | 41.9 | 10,168 |
| | Continental Oil Co. | J. E. Vidrine Tr. 14 #2 | 6/26/40 | 378.00 | 1/4 | 52.4 | 10,256 |
| | Continental Oil Co. | Philio Fontenot #3 | 6/27/40 | 384.00 | 1/4 | 40.2 | 8,988 |
| WEST COTE BL. BAY<br>(St. Mary Ph.) | The Texas Company | State-West Cote BB #1 | 3/22/40 | 162.00 | 13/64 | 23.9 | 8,625 |
| WEST GUEYDAN<br>(Vermilion Ph.) | Magnolia Petro. Corp. | J. Hartwell #1 | 4/27/40 | 146.28 | 1/4 | 40.10 | 7,180 |
| WEST HACKBERRY<br>(Cameron Ph.) | Superior Oil Company | Benson Vincent #9 | 4/8/40 | 453.60 | 3/16 | 36.6 | 8,428 |
| | Superior Oil Company | B. Vincent #10 | 5/24/40 | 421.20 | 3/16 | 36.4 | 7,930 |
| WEST LAKE VERRET<br>(St. Martin Ph.) | Shell Oil Co., Inc. | Jeanerette L & S Co. #4 | 5/7/40 | 288.00 | 17/64 | 33.0 | 8,858 |
| WHITE CASTLE<br>(Iberville Ph.) | Jolly Petroleum Co., et al. | F. B. Adams #1 | 5/22/40 | 240.00 | 12/84 | 28.2 | 9,035 |
| | Shell Oil Co. | A. Wilbert's Sons #16 | 5/25/40 | 356.00 | 16/64 | 27.2 | 6,465 |
| WOODLAWN<br>(Jeff. Davis Ph.) | Union Sulphur Co. | M. F. Johnson #2 | 4/26/40 | 367.08 | 11/64 | 39.4 | 8,102 |
| | Union Sulphur Co. | Johnson #3 | 6/22/40 | 351.12 | 11/64 | 41.0 | 8,127 |

## Louisiana Geological Survey

[Continued from Page 28]

Salle Parish, Louisiana," is now in press. Another entitled "The Tchefuncte Culture, An Early Occupation of the Lower Mississippi Valley" has been completed. Two other reports are in preparation.

The first volume of an exhaustive two volume study of Southeastern ethnography has been finished and is now being edited. This deals with the material culture of the Indians of the Southeast between 1650 and 1800 A. D. Like the other papers mentioned above, this will appear as a bulletin of the Anthropological Study Series issued by the Louisiana Department of Conservation.

Soon after the first of the year the Archaeological Laboratory was moved from New Orleans to permanent quarters in the new Geology building. Since then considerable work has been done in the preparation of material for exhibition and the construction of dioramas illustrating daily life at various periods of Louisiana prehistory.

During the months of March and April a survey of village sites in the alluvial valley of the Mississippi in eastern Arkansas and western Mississippi was undertaken in cooperation with the University Museums, University of Michigan; Peabody Museum of Ethnology and Archaeology, Harvard University; and the National Park Service.

# Oil and Gas Wells Completed in North Louisiana During 2nd Quarter of 1940

| Field | Name of Company | Name of Well | Date Completed | Daily Initial Production | Size Choke (Inch) | Grav-ity | Total Depth |
|---|---|---|---|---|---|---|---|
| BULL BAYOU<br>(De Soto Ph.) | Watts Oil & Gas Co. | Frank Gro. Co. #1 | 4/10/40 | 82.44 | Open | 40.9 | 2,634 |
| COTTON VALLEY<br>(Webster Ph.) | Hunt Oil Co. | Stewart et al #5 | 4/9/40 | 360.18 | 14/64 | 46.5 | 8,613 |
| | Hassie Hunt | Cox #1 | 4/17/40 | 375.96 | 1/4 | 49.4 | 5,925 |
| | Midstates Oil Corp. | Brenner-Beamsley Unit #1 | 5/22/40 | 264.48 | 3/16 | 44.2 | 8,626 |
| | Hunt Oil Company | Robt. Scott #1 | 5/27/40 | 414.00 | 1/4 | 42.7 | 8,710 |
| GEORGETOWN<br>(Grant Ph.) | R. D. Bevil, Jr. | Swope #1 | 4/24/40 | 75.00 | Open | 21.0 | 1,605 |
| | D. E. Grandstaff | Morrison #2 | 5/8/40 | 40.00 | Open | 21.0 | 1,533 |
| MONROE<br>(Morehouse Ph.) | Southern Carbon Co. | Tensas Delta #29 | 4/23/40 | 2-1/2 MCF* | (Gas) | ........ | 2,200 |
| | Southern Carbon Co. | Tensas Delta #30 | 6/5/40 | 3 MCF | " | ........ | 2,230 |
| | Southern Carbon Co. | Tensas Delta #31 | 6/20/40 | 2 MCF | " | ........ | 2,225 |
| MONROE<br>(Union Ph.) | Memphis Natural Gas Co. | Lankford #7 | 4/26/40 | 1 MCF | (Gas) | ........ | 2,195 |
| | Memphis Natural Gas Co. | Frost Lbr. Ind. #4 | 5/10/40 | 1-1/4 MCF | " | ........ | 2,202 |
| | Memphis Natural Gas Co. | Lankford #8 | 5/22/40 | 1-1/2 MCF | " | ........ | 2,190 |
| | Nemours Corp. | Mrs. W. J. Hollis #1 | 5/31/40 | 1-1/2 MCF | " | ........ | 2,207 |
| | Interstate Natural Gas | J. H. Edward #2 | 6/5/40 | 1-1/2 MCF | " | ........ | 2,216 |
| | Memphis Natural Gas Co. | Potts #2 | 6/15/40 | 1-1/4 MCF | " | ........ | 2,193 |
| OLLA<br>(La Salle Ph.) | H. L. Hunt | La. Cent. Lbr. #9 | 4/2/40 | 200.00 | 7/64 | 30.8 | 2,288 |
| | H. L. Hunt | Goodpine #1 | 4/20/40 | 260.00 | 1/4 | 31.0 | 2,272 |
| | H. L. Hunt | La. Cent. Lbr. #11 | 4/30/40 | 192.00 | 1/4 | 31.0 | 2,256 |
| | H. L. Hunt | Goodpine #3 | 5/7/40 | 379.00 | 1/4 | 30.4 | 2,247 |
| | H. L. Hunt | La. Cent. Lbr. #12 | 5/9/40 | 300.00 | 1/4 | 30.4 | 2,238 |
| | Arkansas Fuel Oil Co. | Goodpine #1 | 5/11/40 | 168.00 | 4/64 | 30.0 | 2,410 |
| | H. L. Hunt | La. Cent. Lbr. #13 | 5/13/40 | 320.00 | 1/4 | 30.4 | 2,256 |
| | H. L. Hunt | Goodpine Oil Co. #2 | 5/16/40 | 160.00 | 12/64 | 30.0 | 2,262 |
| | H. L. Hunt | La. Cent. Lbr. #14 | 5/16/40 | 168.00 | 1/4 | 30.4 | 2,230 |
| | H. L. Hunt | La. Cent. Lbr. #18 | 6/15/40 | 144.60 | 1/4 | 30.8 | 2,423 |
| | H. L. Hunt | Goodpine #6 | 6/17/40 | 140.46 | Open | 30.8 | 2,245 |
| | Arkansas Fuel Oil Co. | Goodpine Oil Co. A2 | 6/24/40 | 132.00 | 1/4 | 31.5 | 2,237 |
| | H. L. Hunt | J.E. Gandy-La. Cent. Lbr. #20 | 6/29/40 | 127.00 | 14/64 | 30.5 | 2,458 |
| RODESSA<br>(Caddo Ph.) | F. W. Burford | E. C. Wallis #1 | 4/17/40 | 111.00 | 14/64 | 42.0 | 6,070 |
| SHREVEPORT<br>(Caddo Ph.) | Bobby Manziel et al | City of Shreveport #2 | 4/21/40 | 80.00 | 32/64 | 43.0 | 5,592 |
| | C. H. Lyons | L. Ferris #1 | 6/2/40 | 275.00 | 1/4 | ........ | 5,585 |
| SUGAR CREEK<br>(Claiborne Ph.) | L. E. Ozley | Ozley #1 | 4/26/40 | 242.00 | 12/64 | 31.0 | 5,769 |
| TULLOS<br>(La Salle Ph.) | Georgetown Oil Co., Inc. | Balbridge #4 | 4/18/40 | 20.00 | Open | 21.0 | 1,505 |
| | La Salle Associated Inc. | Urania Lbr. Co. #1 | 6/24/40 | 35.00 | Open | ........ | 1,583 |

* MCF—As used in this table for convenience, means—Million Cubic Feet of Gas.

## The Last Wilderness of the Mississippi Bottomlands

[Continued from Page 16]

traveling cautiously, followed at a short distance by an eight-point buck that was intent only on trailing his mate. At another time a pretty yearling, curious and careless, approached to within twelve steps and circled me, pausing with stamping forefeet to examine the intruder.

There are in the Singer Tract, at several places along the edges of streams or of flats, some salty springs. At most of these the water is just salty to the taste, but one, on the bank of the river, is a flow as briny as sea-water. Deer visit these places frequently in spring and early summer to drink. The trails converging to the licks are well-trod, and the mud around them becomes so pock-marked with hoof tracks that an old one has to be trampled to make a new.

Early one evening, when there was going to be a full moon, I went to one of these springs and climbed into a tree where I could settle myself comfortbaly well above the ground. The evening light was still strong in the little, wet and muddy opening, rimmed by cypress trees, that was the spring. A few minutes later a sound from below made me look, and there—a deer was drinking, having arrived so quietly that I had not seen it. It wore its bright red, summer coat; its head was smooth and antlerless. Between several long and watchful pauses it drank its fill, then quickly turned and trotted off into the forest and out of my sight. Darkness came quickly after that, and then the moon sailed up to cast a shadow-blotched light into the opening. Deer kept coming at irregular intervals, approaching hesitantly and cautiously, drinking with frequent pauses, and then hurrying away. I rarely knew that one was below until it made some sound, drinking or pulling a foot from the mud, for even in the bright moonlight the animals were invisible. I flashed a strong spotlight on each, and surprisingly they minded it not in the least, but continued drinking. The moment I switched off the light, their forms disappeared into the background, and though I strained my eyes, I could not see one unless it moved. Their invisibility in moonlight seemed all the more surprising because at other times their bright red coats contrasted strongly with the dark earth and the green leaves.

After a while a breeze came that blew from me towards the bank from which most of the deer approached. Startled snorts and stamping feet announced my discovery by their nostrils. No more deer would come in, so I clambered down from my look-out and started for camp.

### WILD TURKEYS ABOUND IN THIS BOTTOMLAND

Even more characteristic of southern forests than deer is the wild turkey, the bird that was once proposed for the emblem of our country because of its alertness and dignity. This area is probably by far the best place in the Mississippi bottomland to find turkeys of pure, wild strain. They have much bronze and iridescence in their plumage and blue heads; old gobblers are large and have heads that are almost white, very much in contrast with the red-headed, domestic turkey. They prefer to live on the open ridges, where their sharp-eyed watchfulness protects them from enemies, and the ground is high enough to prevent the nests from being flooded.

There are few sounds more stirring than the clear gobble of an old, wild tom, ringing through the woods in the stillness

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# EDITORIAL

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DEPARTMENT OF CONSERVATION
STATE OF LOUISIANA
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## ENFORCEMENT OF OUR FISH AND GAME LAWS

The efficacy of law enforcement has always depended to a certain extent on the reaction of public opinion to the apparent justice or equity of the law. Unpopular laws have always been difficult of enforcement, no matter how vigilant the apprehension of the law-breaker or how severe the punishment.

In the case of our fish and game regulations, which do not involve any criminal intent and only minor infractions of the law, it appears to be largely a matter of making our hunters and fishermen familiar with the regulations and impressing on them the fact that these regulations are to be enforced.

It is rare that there is any premeditated intent to violate the law, once the public is assured that there is one law for all, of high and low degree, and that no discrimination or favoritism will be shown in its enforcement.

Reorganization of the Enforcement Division of the Conservation Department is now in progress under the general direction of J. A. Partridge, of Lake Charles, who was appointed Executive Assistant to Commissioner B. A. Hardey some weeks ago.

This reorganization is in line with the general program of Governor Jones, to make effective the enforcement of the fish and game laws and at the same time to cooperate with Louisiana sportsmen in providing a more abundant supply of game for hunters and fishermen.

"While we propose to tighten up the enforcement of our fish and game regulations," said Mr. Partridge, "we do not wish to work a hardship on anyone. Violations are generally due to indifference, or ignorance, rather than to any premeditated disregard of the law. We hope to accomplish more through the education of our people than through prosecutions in the courts. We expect to have the cooperation of our sportsmen in this educational work—in fact, we have been assured of this cooperation by the various sportsmen's associations now active throughout the State.

"For our part, we have already undertaken a comprehensive survey to determine how we may be of service to the sportsmen, especially in the propagation and distribution of quail and fish from the State hatcheries. We will keep the public informed of our progress in this direction.

"Owing to its geological history, the variation in its land and water characteristics, from our coastal waters to the uplands of middle and north Louisiana, I doubt if any other state offers a greater variety of wildlife. While this means a variety of sport for our hunters and fishermen, it also means that we are confronted with divergent interests and complicated problems. However, the solution of these problems is largely a matter of constructive effort on the part of our officials and a more enlightened public opinion, which we expect to have."

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## The Last Wilderness of the Mississippi Bottomlands

[Continued from Page 49]

of first daylight. He starts to sound off even before leaving his roost, strutting back and forth on some big limb. Then sailing to the ground, he gobbles, drums, and struts there, parading with head thrown back, wing tips brushing the ground, tail fanned wide, altogether stately as a king.

Besides the turkey and deer and the fine forest, the Singer Tract has one other distinction. There is still living in it almost every species of animal native to the region. Not only are there deer and turkey, raccoon, opossum, and wildcat, animals found in most large, southern woods, but there are also bear, wolf, and panther. These are rarely seen and are known to be present more often by their sign than by their appearance. Panthers are unusual, and since individuals range over a large territory, are probably irregular in the tract. Wolves live and breed in the area. They were a few years ago almost driven out by persistent trapping, but they have since increased and now wolf sign can readily be found along the old woods roads. Many, it not most, of them are coal black; it is a rare and handsome sight to see one of these, a powerful and alert jet-black wolf.

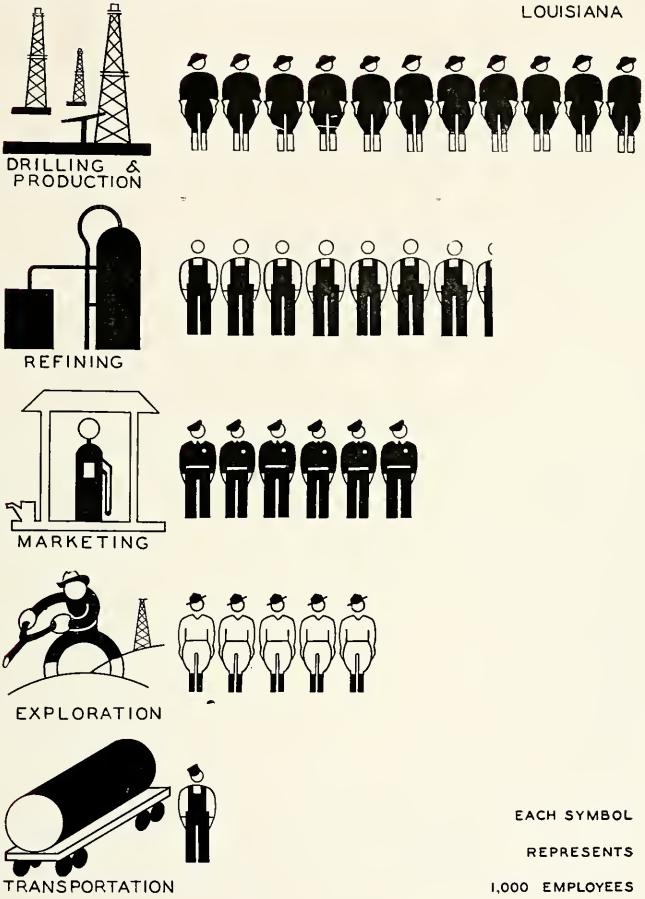
There are several lakes in the area, most beautiful in the summer when they have a tropical appearance. They are long and narrow, lined with a row of cypress of moss-draped limbs and feathery, green tops. Alligators are present in almost all, and in many of them there is one big bull 'gator that dominates the rest. An unforgetable sight was the bull that lived in Rainey Lake. Gigantic, he would swim down the stretch of glassy water with his big, bulbous nose plowing the surface and his scaly crested tail swishing noisily behind, a dreadnought.

### "ABUNDANCE" OF LIFE IN BEAUTIFUL FOREST

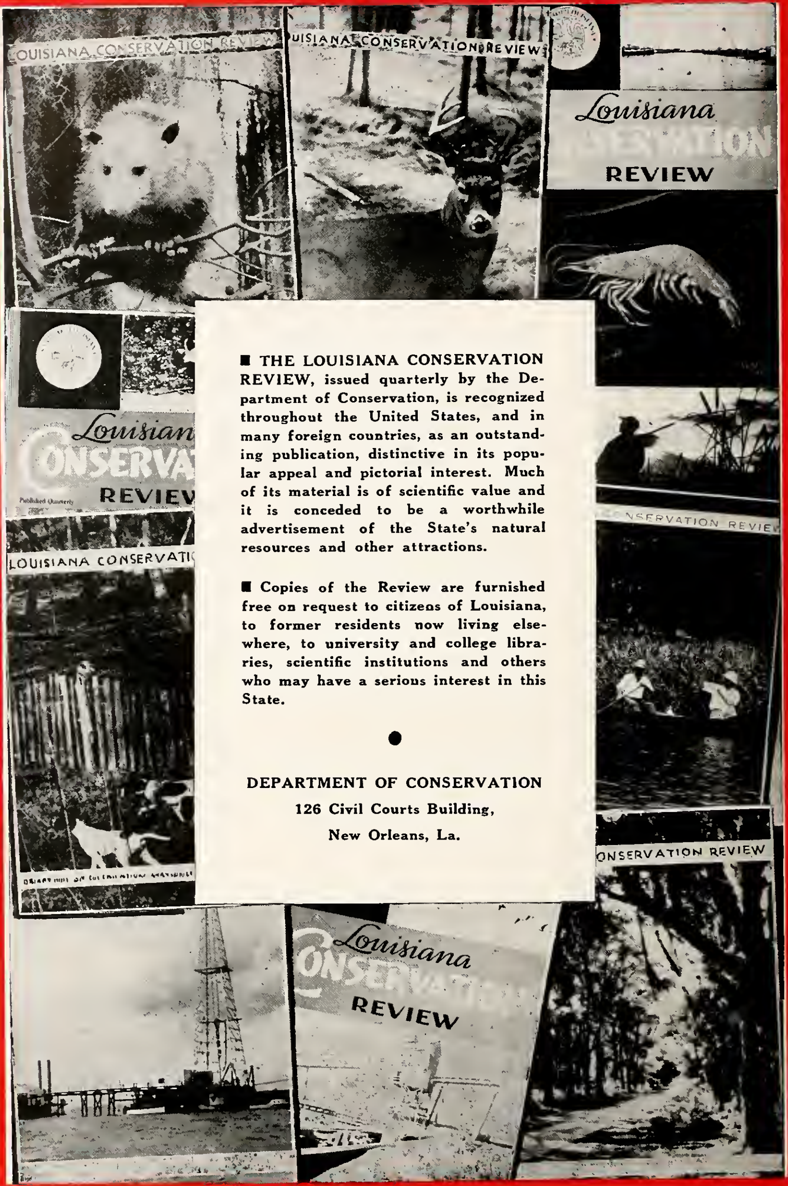
These lakes lie quietly under the bright sun, noisy then only if there is a heron rookery filling the bushes with squawking birds, but they come to life in the evening. Raccoons move around the edges, alligators swim out to the open water and float high, and the frogs loose a bedlam of noise that can be heard for a mile through the woods. Big ones bellow and grunt, small ones whistle, chirp, or bray, and the noisiest of all are the tiny cricket frogs, which sit on the floating vegetation and make a high-pitched, grating trill, deafening because of their abundance.

The word "abundance" fits these woods, an abundance of life in a beautiful forest. There is the luxuriance and variety of vegetation found in the South, still primitive, having the development that only the virgin and untouched can have. It is the last wilderness of its kind, a remnant of a once great forest. Unique today, it deserves protection because of that uniqueness, and more because it is the last example of the wilderness that once covered the Mississippi Valley.

# EMPLOYMENT IN THE PETROLEUM INDUSTRY



■ **The above pictograph by Roy Odom, based on the statistics of C. P. Dunbar, gives us a graphic picture of employment in the Louisiana petroleum industry. It is interesting to note in this connection that while Louisiana ranks fifth among the oil-producing states, following Texas, California, Oklahoma and Illinois, it is third in potential production, according to authentic estimates of its reserves. This means the prospect of increasing yield from year to year and a consequent increase of employment in drilling, production and other branches of the industry.**



■ THE LOUISIANA CONSERVATION REVIEW, issued quarterly by the Department of Conservation, is recognized throughout the United States, and in many foreign countries, as an outstanding publication, distinctive in its popular appeal and pictorial interest. Much of its material is of scientific value and it is conceded to be a worthwhile advertisement of the State's natural resources and other attractions.

■ Copies of the Review are furnished free on request to citizens of Louisiana, to former residents now living elsewhere, to university and college libraries, scientific institutions and others who may have a serious interest in this State.

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DEPARTMENT OF CONSERVATION
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